1984 D.A.T.E. PROGRAM REPORT

ST[illegible]ERVISED AGRICULTURAL DEMONSTRATION PROJECTS

Province of British Columbia
Ministry of Agriculture and Food

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1984
D.A.T.E. PROGRAM REPORT

Demonstration of Agricultural Technology and Economics

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CONTENTS

1984 DATE Program 1

Demonstration of Equipment for Developing Organic Wetlands 3

Forage Improvement Program for Vancouver Island 5

Evaluation of Low Cost Outdoor Domiciles to Overwinter Queen Bees 7

Application of Integrated Pest Management to Lettuce Production 9

Evaluation of High-Tensile, High Voltage Electric Fences to Protect Grape Vines and Haystacks From Deer and Elk Damage 10

Video-Tapes 13

Vegetable Harvest Aid 15

Soil Erosion Control Demonstration Field 17

Demonstration of New Apple Varieties for Coastal Conditions 18

Demonstration of Beef Production on Irrigated Pasture and the Use of High Tensile Smooth-Wire Fencing 20

Establishment and Management of a Rangeland Seeder 23

Oyster Mushrooms 25

Virus and Nematode Screening for Grape Stock 27

Evaluation of a Computerized Apple Scab Predictor 29

Evaluation of Trickle Irrigation Equipment for Injecting Fertilizers and Nematocides 31

Zero-Tillage in Winter Cereals 33

Demonstration of Subsurface Drainage on Creston Flats 35

Evaluation of Lime Additions for Forage Crop Production in the Central Interior 37

Grape Variety Evaluation on Vancouver Island 39

Testing Calf Scours Vaccine in Three Herds 41

Poultry Health Program 43

Globe Artichoke Trial in Golden Nematode Quarantine Area 45

Demonstration of Floating Mulches to Produce Vegetables Earlier 46

Agronomic Factors Affecting Forage Quality and Utilization 47

Control of Carrot Black Rot in Storages 49

Biological Control of Root and Stem Rots of Cucumbers Grown in Artificial Media 51

The Significance of Nematodes in Apple Replant Disease and Poor Growth of Young Fruit Trees 52

Hay Additive Testing 54

Study Tour of Tree Fruit Production in Eastern Canada, The United States and Europe 56

Evaluation of Marek's Disease Control Techniques in Poultry 59

Control of Internal Parasites in Beef and Dairy Cattle 61

Fababeans for High Protein Silage Production on Vancouver Island 62

Demonstration and Evaluation of Vegetable Seeding and Planting Practices in the Peace River, Prince George and Smithers Areas 64

Evaluating Community Pasture Renovation Systems 66

Intensive Rotational Grazing in the Peace River Region 68

Chemical Control of Brush Regrowth on Fencelines 71

Beef Extension Program Evaluations 73

Controlling Resident Elk on Private Agricultural Land 74

Controlling Clubroot of Cole Crops With Lime 76

Maintaining and Testing B.C. Honeybee Stock 78

Propagation and Container Growing of Nursery Stock 80

Demonstration of Integrated Pest Management for Vancouver Island Vegetable Crops 82

Ventilation Systems for Livestock 84

Agricultural Land Clearing Improvement Programs 86

Computer-Aided Drafting of Drainage Plans 88

Demonstration of Drainage System Components 90

Waste Management Guidelines for Farms in Environmentally Sensitive Areas 92

Centre Pivot Systems in British Columbia 93

Waste Management Program 95

Poultry Disease Manual 97

Carrot Variety and Cultural Demonstration 98

Creston Valley Vegetable Growers' Harvest and Post-Harvest Technological Information Project 100

Microcomputers for Ranch Management and Analysis 102

Special Crops Evaluation Project 103

Biological Control of Grasshoppers 104

Economics of Orchard Production Systems 106

Peace River Cereal and Oilseed Evaluation Project 108

Small Irrigation Dam Maintenance Initiative Program 110

Technology Study Tour of Hungary, Germany and England to Improve Grape Production in British Columbia 112

Vineyard Survey for Botrytis Resistance to Rovral 114

Cropping Tomatoes and Cucumbers Under Thermal Curtains 116

Evaluation and Demonstration of Various Aspects of Highbush Blueberry Production in the South Coastal Region 117

Investigation of Co-operative Lamb Marketing Programs in the Maritime Provinces 119

Measurement of Soil Erosion in Peace River Region 120

Demonstration of Ontario Milk Recording System in B.C. 122

Food Irradiation Seminar 123

Technology Transfer - Grape Production 125

TERMS OF REFERENCE

DATE funds may be used for:

1. Evaluating and demonstrating known technological advances for enhancing the production, processing and marketing of agricultural products.

2. Supporting adaptive research projects aimed at solving priority problems confronting British Columbia agriculture.

3. Investigating production, processing and marketing systems to identify or substantiate the need for new technology.

4. Supporting mission-oriented trips with the objectives of: investigating innovative production, processing and marketing techniques for import or ultimate adaption in this Province; and/or investigating export opportunities for British Columbia agriculture and food technology.

5. Importing expertise to assist in introducing new technology or to advise on critical problem situations.

1984 DATE PROGRAM

The DATE (Demonstration of Agricultural Technology and Economics) Program provides funding for staff supervised projects.

The Terms of Reference were expanded in 1984 to allow more scope for capturing technological advances in use elsewhere and where appropriate introducing them to the British Columbia Food System. This resulted in a 400% increase in the number of projects that were approved by the DATE Committee.

Technology missions were undertaken to Europe and the United States to study new developments in high density apple tree plantings that may be applicable to the Okanagan to increase industry profitability.

Another mission to Hungry, Germany and England was approved to determin if production techniques and grape varieties in those countries could be used to improve grape production in the province.

A ministry specialist arranged for and accompanied a tour to study successful vegetable production, processing and marketing systems in the Fraser Valley and Washington State to assist Creston growers to develop and improve the local vegetable industry.

A successful seminar on gamma irradiation to increase the shelf life of some foods was presented to update the industry on the current state of this technology and regulations governing its use.

Out-of-province and local experts were invited to a seminar to discuss beef extension programs in the United States and Canada that may have application in the province to further assist in the development of the cattle industry.

Several projects were devoted to finding solutions to urgent problems confronting farmers in their continuing battle against pests. The DATE program favours integrated pest management techniques that minimize pesticide use.

Computerized systems have been developed to allow fruit growers and ranchers to estimate the impact of management decisions on potential returns. A very positive side effect of this project has been the "hands on" computer experience gained by the producers and ministry specialists.

The ministry's intention to make more efficient use of specialists through the development and distribution of video tapes was supported by purchasing additional agricultural tapes and improving the Information Branch's tape production capability.

The DATE Committee was very pleased with the enthusiastic response by the industry and specialists to the expanded terms of reference which resulted in over 70 new projects dedicated to introducing new technology to the British Columbia Food System.

DEMONSTRATION OF EQUIPMENT FOR DEVELOPING ORGANIC WETLANDS

This breaking plow was highly modified for use on the demonstration wetland meadow

Project Number:	93
Supervision:	Roly Kilpatrick, Agricultural Engineer, Abbotsford; Peter Fofonoff, District Agriculturist, Duncan
Co-operators:	Eric Reay, Farmer; Martin Driehuyzen, Soils and Water Management Specialist, BCMAF; John Metzger, Senior Agricultural Engineer, BCMAF
Branches:	Engineering; Regional Extension Services, Thompson-Cariboo Region
Funding:	D.A.T.E. 1981-82 - $9,800 D.A.T.E. 1982-83 - $4,800 D.A.T.E. 1983-84 - $5,500 D.A.T.E. 1984-85 - $8,350
Objectives:	To develop and demonstrate the special equipment and methods required to optimize forage production on organic wetlands in the interior. All major activities including land clearing, water level control, cultivation and seeding and harvesting are being filmed for use at short courses, workshops and seminars.

Summary:

Organic wetland meadows are shallow lake basins that have filled in with partially decomposed plant material. There are in excess of 2 million acres of these meadows that can be developed for grazing and hay production.

The production on native meadows can be more than doubled by reseeding with Reed Canary grass and fertilizing, however, due to the low load bearing capacity, high water tables and other characteristics, specialized equipment and water management schemes are required.

The Eric Reay meadow, at Meldrum Creek east of Williams Lake, has been developed as an equipment evaluation and meadow development demonstration site. The meadow has been disced and a new grass stand established. Forage production will be monitored over the next few years.

Recommended methods of development and costs have been presented to ranchers at field days and as a result, many have begun improving their own native meadows.

If ditches are constructed prior to clearing, the brush helps support equipment, thus a conventional rather than a high flotation excavator can be used.

Brush up to 4 inches in diameter can be cleared using a heavy duty rotary mower with a conventional 2 wheel drive tractor if clearing is done in the winter when the ground is frozen several inches deep and there is little or no snow.

Plowing cannot be done with commercially available equipment. A plow with a knife instead of disc coulters and a long gently sloping moldboard operated well in open areas but plugged with root clumps in recently cleared areas. As plowing costs amount to 25% of development cost, the design of a high production organic soil plow is underway.

FORAGE IMPROVEMENT PROGRAM FOR VANCOUVER ISLAND

Farmers attending an Open House at the P.J. Ranch,
Courtenay, to see work progress on the project

Project Number: 94

Supervision: Peter Jones, District Agriculturist, Courtenay

Co-operators: Vancouver Island Sheep Breeders' Association; Field Angus Club

Branches: Regional Extension Services, South Coastal Region; Field Crops Branch

Funding: D.A.T.E. 1984-85 - $800

Objectives:

1. Evaluate new forage species for Vancouver Island.
2. Compare pasture improvement methods using existing forage species.

Summary:

1. Stage of growth is more important than species or variety of grasses in determining nutritive value.
2. When grasses are at the pasture stage the total yield is relatively low, but the nutritive value is high. How high depends on the amount of fertilizer applied.

As the grasses mature and increase in total yield, the nutritive value falls. Although there are some variations between species and varieties in the rate of decline, stage of growth has the biggest effect.

3. Differences between species and varieties become much more important when looking at such things as:

   a) rate of regrowth;
   b) date of heading; and
   c) seasonal production.

4. Perhaps the most striking information arising from this work is the very high quality feed produced in the September/ October period regardless of species or varieties when fertilized on a regular basis.

   Too often farmers neglect to fertilize after the summer dry period because the yield responses then are definitely less dramatic than the spring applications. However, there is a golden opportunity to produce very high quality feed and thus save expensive winter feed as demonstrated in these results. The cost of the extra fertilizer is covered several times over by extending the grazing season.

EVALUATION OF LOW COST OUTDOOR DOMICILES TO OVERWINTER QUEEN BEES

Inserting a "compartment frame" in the holding hive for long term banking of queens, which are kept in compartment by squares of queen excluder material.

Project Number: 97

Supervision: Doug McCutcheon, Supervisor of Apiculture Program, Abbotsford

Co-operators: B.C. Honeybee Stock Improvement Project; Simon Fraser University

Branches: Field and Special Crops, Apiculture Program

Funding:
D.A.T.E. 1982-83 - $4,124
D.A.T.E. 1983-84 - $3,300
D.A.T.E. 1984-85 - $3,100

Objectives: To develop practical methods of overwintering large numbers of honeybee queens and to demonstrate such methods in supplying commercial queen honeybee requirements in April and May.

Summary: Of the four queen overwintering methods evaluated in 1982/83, one was selected for more extensive testing in 1983/84. In this method, queens were placed on 4 x 4 cm sections of honey comb, surrounded by wooden sides and covered by queen excluder material.

From 48 queens placed in the bank hive in the fall of 1983, only 10 were alive in the spring of 1984. This 21% rate of survival is not considered an economical way of overwintering queens in commercial quantity. However, in view of the successful results obtained during the previous season, further testing of this method of overwintering of honeybee queens is being carried out in 1985/86, with a number of major modifications.

In addition, bees and queens have been installed in small domiciles, constructed of styrofoam (approx. 20x20x20 cm). Results will be available in the spring of 1985.

APPLICATION OF INTEGRATED PEST MANAGEMENT TO LETTUCE PRODUCTION

Project Number: 99

Supervision: H. S. Gerber, Entomologist, Cloverdale

Co-operators: William Dun, Pest Management Contractor; Robert S. Vernon, Research Scientist, Agriculture Canada; George Rush, Manager, Cloverdale Lettuce and Vegetable Co-operative; Sixteen lettuce growers

Branches: Crop Protection

Funding: D.A.T.E. 1984-85 - $7,200

Objectives: To monitor lettuce fields for the presence of the lettuce aphid *Nasonovia ribisnigri*, to inform growers of presence or absence of aphids, and to determine efficacy of insecticide sprays applied to control the aphids.

Summary: During 1982, an estimated $1 million of lettuce had to be plowed under because it was infested with lettuce aphids. In 1983 the lettuce fields were closely monitored and the aphids were controlled as soon as they were detected. No crop was lost due to aphid infestation.

In 1984 it was further demonstrated that monitoring lettuce fields for lettuce aphids is essential to minimize losses caused by aphid infestation.

The monitoring program this past summer, as well as some tests done by Agriculture Canada, indicated that the aphids may be developing resistance to one of the insecticides that is regularly used by growers. As a result, Agriculture Canada will do some tests on the aphids this winter to determine if resistance is developing.

EVALUATION OF HIGH-TENSILE, HIGH VOLTAGE ELECTRIC FENCES TO PROTECT GRAPE VINES AND HAYSTACKS FROM DEER AND ELK DAMAGE

Slanted "New York" electric deer fence protecting
a young apple orchard in the Okanagan

Project Number: 100

Supervision: H. A. Kluge, Vertebrate Specialist, Victoria

Co-operators: G. G. Anderson, Senior Pest Control Officer; C. G. Carter, Pest Control Officer; H. G. Geldart, Regional Farm Economist; K. B. van Dalfsen, Agricultural Engineer; V. Kuntz, Rancher, Wycliffe; H. Verbeek, Fruit Grower, Westbank; D. Zanatta, Grape Grower, Duncan

Branches: Crop Protection

Funding:

D.A.T.E. 1981-82 - $ 200
D.A.T.E. 1982-83 - $3,000
D.A.T.E. 1983-84 - $1,400
D.A.T.E. 1984-85 - $5,050

Objectives:

1. To evaluate vertical high-tensile electric fence designs to exclude deer from orchards and vineyards.
2. To evaluate a vertical high-tensile electric fence design to exclude elk from hay stackyards.
3. To evaluate a slanted high-tensile electric fence design to exclude deer from orchards.
4. To compare the costs of construction, operation and maintenance of electric wildlife fences to those of conventional page-wire fences.

Summary:

Permanent wildlife fences should incorporate two basic components: high-tensile wire and high-voltage, low-impedence energizer. High-tensile wire (180,000 psi.) has a high breaking strength and high elasticity. All wire used in this project was 2.5 mm (12 and 1/2 ga.) smooth galvanized steel. It was installed on pressure-treated posts using high-density plastic insulators at 30 cm spacings. Wire tensions were set and maintained at 180 to 200 lbs. using permanent in-line tensioners (strainers). Post spacings were up to 19.5 m on level ground. High-voltage, low-impedence energizers generate short-duration (0.3 ms) pulses at about 1 s intervals. The energizers used in this project were 12 V DC battery-operated or 110 V AC plug-in models. Usually, energized wires were alternated with ground-return wires. Under ideal operating conditions, both types of energizers produced output voltages of 6,800 to 7,200 V.

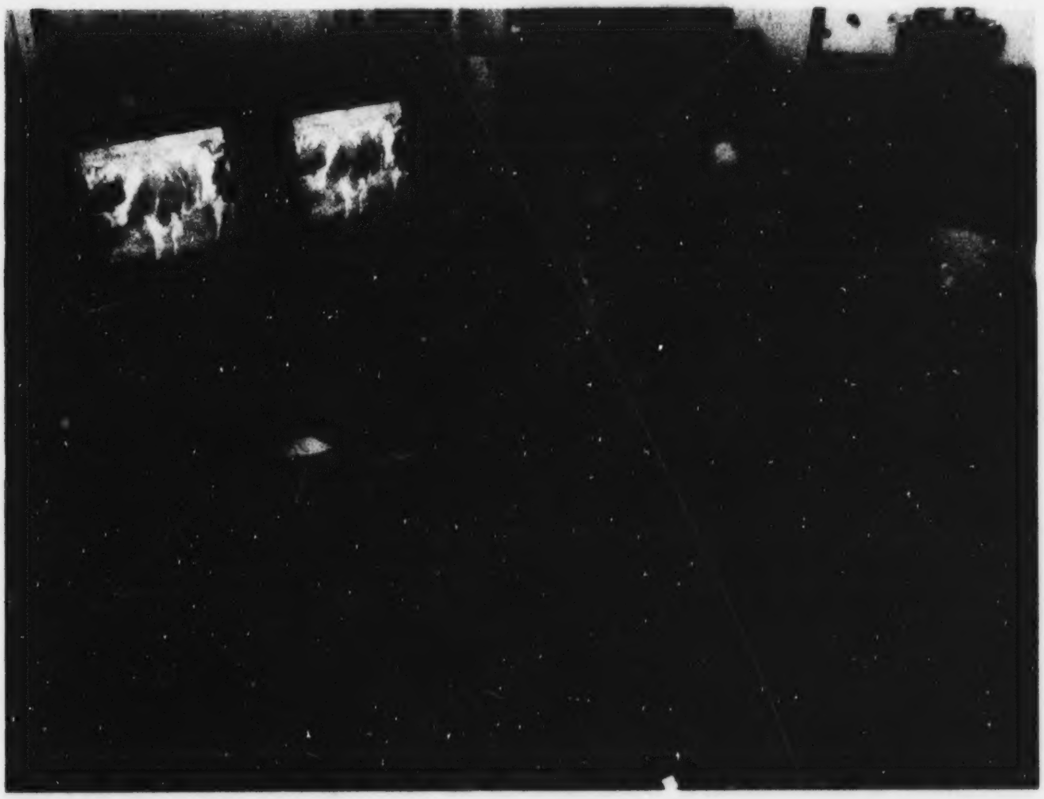
In June, 1982, a 1.5 m high, 5-wire vertical "Penn State" electric fence was constructed around a block of young apple trees in an orchard near Vernon. In order to exclude mule deer as well as white-tailed deer, the height of the fence was increased to 2.1 m by adding two strands of wire. There was little or no evidence of deer damage to the fruit trees in winter 1982-83. This experimental design was described and illustrated in the Electric Fencing Manual (BCMAF 1983). A Field Day was held at the orchard site on April 12, 1983. This fence was removed at the owner's request in September, 1983, after a new fence of the same design had been installed around the entire orchard.

In October, 1982, a 2.4 m high, 7-wire vertical electric fence was built around a hay stackyard on a beef cattle ranch near Cranbrook. There was no evidence of elk damage to the haystacks in winter 1982-83. However, the experimental design was modified to an 8-wire configuration to ensure that the fence would also be deer-proof. Again, there was no evidence of elk damage to the haystacks in winter 1983-84. A Field Day was held at the ranch site on February 2, 1984.

In December, 1983, a 7-wire slanted "New York" electric deer fence was constructed around a block of apple trees in an orchard in Westbank. The wires were installed at 30 cm intervals on 2.1 m long diagonal rails; the overall height of the slanted fence was 1.2 m. There was no evidence of deer damage to the fruit trees in winter 1983-84. A Field Day was held at the orchard site on March 30, 1984. The major disadvantages of this design are the loss of the use of a 1.8 m wide strip of orchard along the fence line and the need to maintain good vegetation control under the slanted sections of the fence.

In June, 1984, a 1.8 m high, 7-wire vertical deer fence was built around a hayfield containing a grape variety trial (D.A.T.E. Project #125) near Duncan. This experimental design differed from previous configurations in that the lower wires were spaced closer together (20 to 25 cm) and were all energized. Initially, deer could crawl under the bottom wire in places where dips between line posts provided sufficient height; this problem was resolved by installing "droppers" and energizing the bottom wire. There was no evidence of deer damage to the vines during the rest of summer and fall 1984. A Field Day to demonstrate the grape variety trial, the electric deer fence and a trickle irrigation system was held at the vineyard site on August 13, 1984.

VIDEO-TAPES



A/V technicians edit video programs to customize them to B.C. conditions

Project Number:	103
Supervision:	Ron Sera, Director, Information Services Branch, Victoria
Co-operators:	Dave Kent, Coordinator, Media Production Centre; Bruce Russell, Summer Employee, Media Production Centre; Sally Abbott/Bill Armstrong, Media Production Centre
Branches:	Information Services
Funding:	D.A.T.E. 1984-85 - $20,000 D.A.T.E. 1985-86 - $ 4,000

Objectives: Encourage farmers and ministry staff to use modern electronic communications techniques in agricultural extension, and to demonstrate the ease and benefits of using video-tape programs as educational tools.

a) Enhance the ministry's audio-visual library with 40 to 60 audio-visual programs per year;

b) Customize purchased non-B.C. audio-visual programs to B.C. agricultural conditions.

Summary: This project is a continuation of work carried out during 1981-83 which involved the purchase of two video-tape playback units as pilot units in the Prince George and Kamloops ministry offices. Farmer response to these units was best when the machines were available at staff-run events. Programs were primarily aimed at the livestock industry although some were of general interest.

Expansion of the video-tape library was emphasized in order to substantially increase subject matter availability for farmers and field staff. Twenty-six audio-visual programs were ordered since June, 1984 although few had arrived at time of writing. More are being ordered and should be incorporated into the audio-visual library by year end despite difficulties with cross-border shipping from U.S. sources. Response to these programs will be monitored. Records indicate strong staff and farmer use of existing machines and a/v programs. However, the limited number of specific programs on a wider range of topics is the obvious limitation to optimum effectiveness.

A small video-tape editing system was purchased to enable video, slide-tape and film programs ordered from non-B.C. sources to be customized to suit B.C. agricultural conditions. This will facilitate staff and farmer use of a standard video format for ministry audio-visual programs.

An added six video playback units were purchased and distributed to ministry field offices in Fort St. John, Smithers, Salmon Arm, Vernon, Williams Lake and Creston. These placements were in addition to machines already in Dawson Creek, Prince George, Kamloops, Kelowna, Abbotsford, Cloverdale, Summerland and Victoria.

As the project continues, more farmers and staff are expected to make use of the expanding audio-visual library due to the markedly increasing number of machines being purchased by farmers and the increasing familiarity and use of the ministry machines by field staff. The transfer of information by this media is becoming more efficient and cost effective in extension programming.

VEGETABLE HARVEST AID

Yin Soo, co-operating vegetable grower, and Roly Kilpatrick, Project Supervisor, with wagon mounted vegetable harvest aid

Project Number:	105
Supervision:	Roly Kilpatrick, Agricultural Engineer, Abbotsford
Co-operators:	Yin Soo and Howe Wong, vegetable growers; George Rush, Cloverdale Lettuce and Vegetable Co-operative; Jim Conroy, Regional Vegetable Crop Specialist, BCMAF
Branches:	Engineering
Funding:	D.A.T.E. 1982-83 - $7,150 D.A.T.E. 1983-84 - $2,200 D.A.T.E. 1984-85 - $5,200
Objectives:	To design, fabricate, field test and evaluate a harvesting aid to assist and improve present methods of hand harvesting lettuce, cauliflower, cabbage and broccoli. The harvest aid will facilitate picking, grading, boxing and palleting operations.

Summary:

Many vegetable crops in British Columbia are harvested almost entirely with machinery. These crops include potatoes, carrots, peas and beans. In some other areas of North America, notably the state of California, mechanical harvesters and harvest aids are also commonly used in asparagus, cauliflower, celery, lettuce, peppers and tomatoes.

Crop sensitivity to physical handling, adverse field conditions during harvest, and non-uniform crop growth are local factors which limit practicality of using existing equipment to harvest these and other vegetables in B.C.

A desire to mechanize the harvesting of several local crops, the primary two being cauliflower and lettuce, was expressed by a number of Cloverdale area vegetable growers. This would reduce the cost of vegetable production, by minimizing the amount of hand labour required for harvest. All of the lettuce and cauliflower grown in British Columbia is currently picked, trimmed, packaged and loaded onto trucks or trailers by hand.

In 1982-83, a tractor mounted, conveyor belt type harvest aid was designed and fabricated. Field testing during the 1983 harvest season indicated that the rate of harvest is increased by about one half when using this machine. Continued testing revealed that the configuration of the system, with the harvest aid mounted between the tractor and the wagon, caused difficulties in loading and handling the produce.

In 1984, the wagon and harvest aid were modified, so that the harvest aid could be mounted on the back of the wagon. This change allowed the use of conventional pallet and bin loading and handling procedures. It also improved the manoeuverability and safety of the system, by reducing its overall length, and eliminating the relative motion between the elevating conveyor and the wagon.

SOIL EROSION CONTROL DEMONSTRATION FIELD

Project Number:	106
Supervision:	R. C. Wood, Soils Specialist, Cloverdale; M. G. Driehuyzen, Provincial Drainage Specialist, Cloverdale
Co-operators:	N. Mahal, Strawberry Farmer, Aldergrove
Branches:	Soils
Funding:	D.A.T.E. 1982-83 - $2,750 D.A.T.E. 1983-84 - $ 500 D.A.T.E. 1984-85 - $ 500
Objectives:	To evaluate the effectiveness of interceptor drains in reducing water runoff and soil erosion on sloping land in the Lower Fraser Valley.

Summary:

Sloping land in the Lower Fraser Valley is subject to severe water erosion if it is left in a bare cultivated condition during the winter months. In recent years, many acres of erosion-prone soils have been taken out of permanent pasture and put into small fruits or vegetables, with significant soil erosion as a result.

A demonstration was set up in 1982 to measure water runoff and soil erosion from two adjacent plots on a strawbery field. One plot was serviced with an interceptor drainage system to divert water from running down the slope, while the adjacent plot was not drained. Water runoff and soil erosion losses were measured over the winter of 1982-83 and 1983-84. The results were that the drained site lost less than a one-half tonne of soil per year per hectare while the undrained site lost more than 26 tonnes per year per hectare.

This demonstration showed that an interceptor type drainage system can reduce water runoff and soil erosion significantly. However, it is impractical to maintain an interceptor type drainage system on cultivated land due to plugging and for this reason, this system alone will not serve to control runoff and erosion. Three years of observation at the project site, and on farmland in the same area lead to the conclusion that runoff and erosion can be reduced to acceptable levels with conventional drainage provided that crops are grown across slopes, rather than up and down, and a winter crop is grown rather than leaving the soil bare.

DEMONSTRATION OF NEW APPLE VARIETIES FOR COASTAL CONDITIONS

Delia Warnock - Summer Student maintaining
cover crop at Saanichton planting

Project Number:	108
Supervision:	G. B. Warner, Horticulturist, Sidney
Co-operators:	Plant Quarantine and Research Station, Agriculture Canada, Sidney; Bob Cropper, Orchardist, Courtenay; John De Whalley, Farmer, Sointula, Malcolm Island
Branches:	Regional Extension Services, South Coastal Region
Funding:	D.A.T.E. 1982-83 - $ 600 D.A.T.E. 1983-84 - $ 250 D.A.T.E. 1984-85 - $2,550

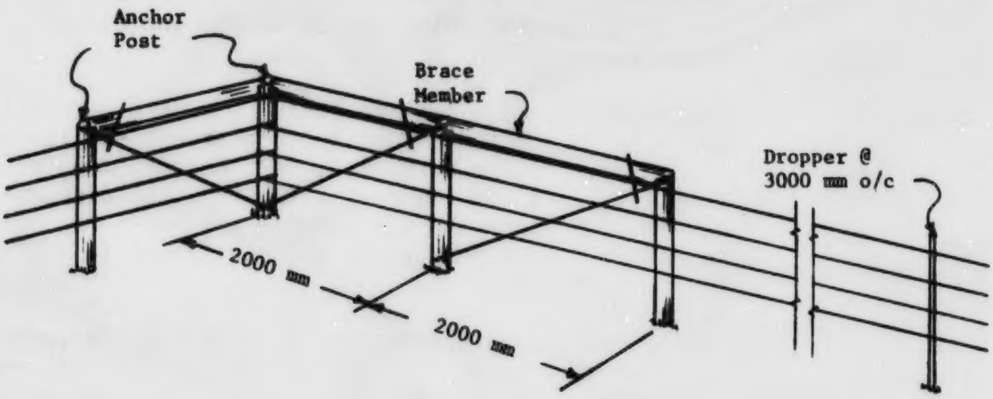
Objectives: To evaluate through field trials the suitability of new varieties of apples for growing under coastal conditions. Newer varieties, some with disease resistance, are to be observed to see how they compare with current commercial varieties for both disease resistance and commercial acceptance.

Summary: The plantings at all three locations performed well with some varieties producing a considerable amount of fruit even though pollinating conditions were poor. Scab infection on the test fruit was limited, although local orchards suffered severe scab damage on susceptible varieties due to the large number of infection periods (31 monitored) in 1984.

In the past year, all new plantings contain many of the new varieties. Considerable interest has been shown by local orchardists in some disease resistant varieties, but further observations are required before firm recommendations can be made.

Reports on this year's limited harvest will be presented at the 1985 Grower's Course on Vancouver Island. Next year, most of the trees should be fruiting and a series of field days will be scheduled to demonstrate these varieties as well as training and irrigation systems.

DEMONSTRATION OF BEEF PRODUCTION ON IRRIGATED PASTURE AND THE USE OF HIGH TENSILE SMOOTH-WIRE FENCING



End or corner brace assembly with droppers

Project Number:	112
Supervision:	E.L. Moore, Regional Extension Services, Kamloops; B. van Dalfsen, Engineering Branch, Vernon; L. Brown, Engineering Branch, Kamloops
Co-operators:	A. Caldow, Manager, Tranquille Farm; Coldstream Ranch Ltd.
Branches:	Regional Extension Services, Thompson-Cariboo Region; Engineering
Funding:	D.A.T.E. 1982-83 - $2,330 D.A.T.E. 1983-84 - $ 670 D.A.T.E. 1984-85 - $ 150

Objectives:

1. To demonstrate productivity of irrigated pastures in comparison to range for beef production.

2. To demonstrate alternative management techniques to improve beef production using a combination of range and irrigated pasture.

3. To investigate the potential of supplemental grain feeding to finish cattle directly off pasture.

4. To determine the effectiveness of smooth wire, high tensile fencing under conditions of high cattle pressure and to develop suitable materials and methods to build more economical cattle fences.

Summary:

I. Beef Production Results

In the first year of this project, it was demonstrated that steers on irrigated pasture have an average daily gain almost double the gains of steers on range. Steers on irrigated pasture for the full grazing season gained an average of 393 pounds, while steers on range gained 270 pounds. A group of steers on range during the spring and early summer, then on irrigated pasture for the summer-fall period, gained 337 pounds.

In the second year, the primary objective was to determine the potential for finishing cattle directly off pasture by feeding supplemental grain for a short time period (40 days). This proved to be effective in increasing the average daily gain and resulted in all carasses grading A1.

II. Smooth-Wire Fencing Results

1. Droppers

Smooth-wire fencing was used initially to subdivide the pasture. It was found after the first year of operation that additional evaluation was required on dropper designs, as well as strainer assemblies. In the third year of this project, 3 types of droppers were evaluated, 2 metal types and a homemade 2" X 2" wooden dropper with angled grooves. In high pressure cattle conditions, only the 'Waratah' type metal dropper could be recommended. Wooden droppers made from hardwood or with an improved fastening method might be an economical alternative.

2. Strainer Assemblies

A number of different strainer assemblies were constructed and tested for strength by pulling to failure with a tractor. The failure of the strainers was videotaped for later analysis and for use in extension programs.

For the soils in which the strainers were tested, the average strength of 3 strainers of each design tested were:

Strainer Design	Strength	
	lbs.	KN
6 foot horizontal post single span	5,120	22.8
10 foot horizontal post single span	5,830	25.9
10 foot diagonal post single span	4,370	19.4
6 foot horizontal post double span	6,830	30.4

Further work is required to complete the evaluation of strainer strength.

ESTABLISHMENT AND MANAGEMENT OF A RANGELAND SEEDER

Project Number: 113

Supervision: R.M. Tegart, Field Crops and Range Specialist, Creston; M.J. Malmberg, District Agriculturist, Cranbrook

Co-operators: W.O. Green, Skookum Ranches, Skookumchuck; L.G. Brown, Engineering Technician, BCMAF; N.A. Gough, Soil Fertility Specialist, BCMAF

Branches: Regional Extension Services, Okanagan-Kootenay Region

Funding:
D.A.T.E. 1982-83 - $1,018
D.A.T.E. 1983-84 - $6,260
D.A.T.E. 1984-85 - $3,150

Objectives: The Project has four objectives:

- To promote the use of the Ministry's very successful rangeland seeder to ranches in the East Kootenays.
- To demonstrate the tillage and seeding requirements necessary to establish rangeland seeding using the rangeland seeder.
- To evaluate a Crested Wheatgrass/Alfalfa seeding by measuring animal performance and forage productivity and carrying through with an economic evaluation.
- To provide local information on species and variety selection, fertility needs and the economics of fertilization.

Summary: One hundred acres were seeded at a rate of six pounds of Parkway Crested Wheatgrass and one pound of Rambler Alfalfa. Seeding was completed in early November, 1983 using the rangeland seeder. The seeding has established very well and grazing by cattle will commence in the spring of 1985.

Eight other grass species and/or varieties were seeded at the same time, however they have varying degrees of success at establishing.

Two successful field days were held to demonstrate the equipment and for seeding results. Interest in this type of range improvement was easily generated and has resulted in several private land seedings by the rangeland seeder in the East Kootenays.

OYSTER MUSHROOMS

Oyster Mushrooms grow on sawdust.

Project Number:	115
Supervision:	J. T. Hill, District Horticulturist, Agriculture and Food Centre, Abbotsford
Co-operators:	Marketing and Economics Branches, BCMAF; B.C. Research; MacMillan Bloedel Research; Cart-O-Log of B.C.
Branches:	Regional Extension Services, South Coastal Region
Funding:	D.A.T.E. 1983-84 - $7,400 D.A.T.E. 1984-85 - $4,000
Objectives:	To develop suitable growing media and cultural methods for the production of oyster mushrooms and determine production costs and market potential.
Summary:	During early work in B.C., the oyster mushroom was grown on a supplemental base of pulp mill waste. Realizing that pulp mill waste was limited to a few areas in the province, we decided to evaluate other cellulose bearing materials as a suitable growing media. A wide range of materials were found that would support growth, including Hemlock, Fir and Spruce sawdust. This means that production of oyster mushrooms is feasible in most areas of the province.

An aerated steam bulk pasteurization system has been developed that will process sufficient material to supply small family size farms.

Contact with small growers and buyers indicates that there is enough consumer demand to support a small industry and demand is expected to grow as the public becomes aware of this new product.

A handbook on growing oyster mushrooms is under preparation.

VIRUS AND NEMATODE SCREENING FOR GRAPE STOCK

Project Number: 116

Supervision: J. Vielvoye, Provincial Grape Specialist, Kelowna; D.J. Ormrod, Plant Pathologist, Cloverdale

Co-operators: R. Stace-Smith, Research Scientist, Agriculture Canada; T. Vrein, Research Scientist, Agriculture Canada; J. Bates, Contractor, BCMAF

Branches: Regional Extension Services, Okanagan-Kootenay Region; Crop Protection

Funding: D.A.T.E. 1983-84 - $7,500
D.A.T.E. 1984-85 - $6,500

Objectives:

1. To test an ELISA technique for the detection of Fanleaf, Tomato Ringspot and Arabis Mosaic viruses in grapes.

2. Using the ELISA technique, to test specific grapevines in order to determine if they are suitable for use in establishing propagation blocks.

3. To determine levels of nematodes, particularly Xiphinema spp. in vineyards proposed to be used for propagation of virus tested grapevines.

4. To study the Xiphinema populations isolated with a view to identifying species involved and their virus transmitting abilities.

5. To transfer the technology of the ELISA technique from research programs to a service oriented laboratory.

Summary:

Changes in consumer demand and the advent of cottage wineries have increased the demand for new grape varieties. It is critical that these be screened to ensure they are free of harmful viruses and nematodes. Because varieties cannot be cleared rapidly enough using conventional techniques there is a temptation to short-circuit the system.

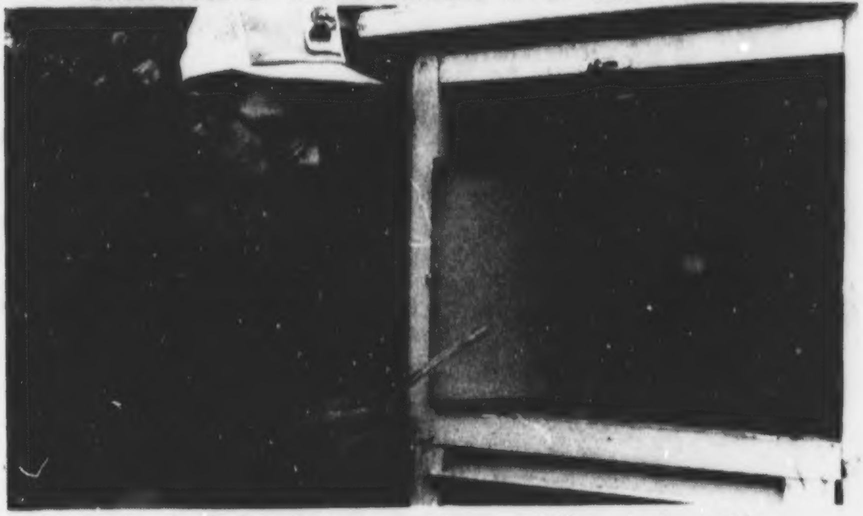
In this project a new system for rapidly detecting some viruses, ELISA, was introduced. Simultaneously, nematode detection and virus transmission studies were conducted.

In 1983 samples from 11 vineyards and 100 varieties were tested for 3 important viruses and Xiphinema nematodes. None of the varieties contained Tomato Ringspot virus; 2 contained Fanleaf virus and 16 contained Arabis Mosaic virus. Unfortunately, one of the more harmful viruses, Leafroll, cannot be detected by this method and thus there is no assurance that these vines are virus-free. Of the 96 soil samples, 25 contained Xiphinema nematodes.

In 1984, new samples were collected in the Kelowna area to test for Xiphinema americanum. This survey, along with 1983 work, confirms that this nematode is wide spread in the Kelowna area.

The Ministry's Pest Diagnostic Laboratory is now capable of conducting the ELISA test for future survey and screening programs.

EVALUATION OF A COMPUTERIZED APPLE SCAB PREDICTOR



Apple Scab Predictor monitors weather information.

Project Number:	118
Supervision:	R. D. Hallman, District Horticulturist, Creston
Co-operators:	John Yorston, Plant Pathologist, BCMAF; John Procter, Entomologist, BCMAF; Rick Williams, Climatologist, B.C. Ministry of Environment; Roy and George Schuler, Orchardists, Creston; B.C. Fruit Growers' Association
Branches:	Regional Extension Services, Okanagan-Kootenay Region
Funding:	D.A.T.E. 1983-84 - $3,600 D.A.T.E. 1984-85 - $1,750

Objectives:

1. To evaluate the new computerized "Apple Scab Predictor" for use in orchards, and compare it to conventional equipment for apple scab infection prediction.
2. To improve the accuracy and dependability of apple scab disease infection warnings being issued by the B.C. Ministry of Agriculture and Food.
3. To evaluate this equipment as an orchard management tool for:

   a) timing codling moth control sprays;

b) timing control sprays for other insects and diseases;
c) predicting stages of development of fruit trees for the timing of cultural practices.

Summary:

Apple scab is the most significant disease in high rainfall growing areas of British Columbia. During the last few years it has become established in drier areas such as the south Okanagan. The weather conditions that lead to an infection of this disease are a combination of surface wetness, relative humidity over 90% and temperature. By monitoring these conditions, and locating infections as they occur, apple growers can effectively control this disease by timely applications of fungicides.

The monitoring equipment that is used in British Columbia does not always accurately predict the disease.

The Apple Scab Predictor is an in-orchard microcomputer electronic monitoring system which automatically records weather information and determines if an apple scab infection has occurred. It is also capable of recording degree days (a measure of heat received), a function which assists the timing of codling moth control sprays.

The Apple Scab Predictor proved to be more sensitive in the detection of marginal infection periods. During the spring of 1984 it predicted one infection period that the conventional equipment failed to predict. It was difficult to determine at the time if this was a false reading as there were several infection periods within a very short time. Testing during the 1985 season will be aimed at sorting out this problem.

The Apple Scab Predictor eliminated problems of interpretation of the data being produced by conventional monitoring equipment. It also eliminated problems that have been experienced with the conventional equipment, such as mechanical failure, human failure to wind or supply ink to the machine, and severe calibration problems. When all else went wrong, the Apple Scab Predictor produced the required information to stay on top of the disease situation.

The Predictor also produced a detailed record of all components of each infection period and a prediction of the time left to apply various fungicides with after-infection activity. This data added a new dimension to the management of this disease and will help to determine where things went wrong if actual infections do occur in the orchard.

EVALUATION OF TRICKLE IRRIGATION EQUIPMENT FOR INJECTING FERTILIZERS AND NEMATOCIDES

Pepper and strawberries grown in minitunnels use trickle irrigation system to supply nutrient requirements

Project Number: 119

Supervision: T.W. Van der Gulik, Agricultural Engineer, Abbotsford

Co-operators: Brian Harding, Agriculture Canada, Agassiz Research Station

Branches: Engineering

Funding: D.A.T.E. 1984-85 - $3,200

Objectives: To demonstrate the benefits of applying fertilizers and nematocides to raspberries and row crops using trickle irrigation systems. The effects of mulches and minitunnels on peppers and strawberries is also being evaluated. Different emitters are used on the various treatments to determine the type of trickle system best suited for this application.

Summary:

A biwall trickle irrigation system has been operating on strawberries with and without plastic mulch since the spring of 1983. In 1984 this experiment was extended to include strawberries grown under a minitunnel. Although the system has worked admirably the biwall is showing some wear and tear. Strawberries grown in the minitunnel were ready for harvest weeks before the outdoor crop. The fruit quality was also good despite the poor weather conditions this spring.

A point source in-line emitter system was installed in a pepper plot in 1984. Various types of emitter systems were also installed in the raspberry plots. Results from these experiments will not be available for two to three years. These plots will be used to:

1. Evaluate emitter performance under a combination irrigation and fertilizer scheme.

2. Evaluate the performance of various crops under different combination irrigation/fertilizers and mulches.

3. Investigate alternate uses for trickle systems such as the application of nematocides and herbicides.

4. Develop a guide for the application of fertilizer through a trickle irrigation system.

Reports and other literature will be made available when data and design standards have been developed.

ZERO-TILLAGE IN WINTER CEREALS

Project Number:	121
Supervision:	Jack Dobb, Provincial Specialist, Cereal, Oilseed and Seed Crops, Dawson Creek
Co-operators:	Frank Breault and Don Pederson, Producers
Branches:	Field and Special Crops
Funding:	D.A.T.E. 1984-85 - $15,500
Objectives:	To develop and demonstrate a management system using zero-till in conjunction with new seed treatments, and/or late fall fungicide applications; and, new cultivars with the view to establishing winter wheat as a viable cropping option in the Peace River region. Secondarily, using similar techniques to reduce the risk of growing fall rye.
Summary:	The use of zero-till has expanded the traditional winter wheat growing area from southern Alberta to Saskatchewan and Manitoba, due to higher soil temperatures in the winter possible under zero-till. Low winter soil temperatures are not usually the problem in winter losses in the parkland belt and the Peace River region, except in the winter of 1983/84. Killing is usually from a variety of snow mould organisms. Early planting, i.e. August, improves snow mould tolerance and reduces cold tolerance in both wheat and rye. Rye has more tolerance to both conditions than does winter wheat.

Zero-till seeding can offset the effect of reduced cold tolerance. It might be expected that snow mould could be more severe under the increased residue conditions of zero-till. However, this has not been the case so far. The disease appears to be more related to prolonged snow cover combined with warmer soil surface temperatures particularly in March and early April.

Zero-till offers the opportunity of saving time and input cost by zero-tilling a crop, directly after combining, into the stubble of some of the new early barley varieties or into canola stubble.

Preliminary work with zero-till and winter cereals in the Peace River region has provided the following results:

Norstar Winter Wheat 1982

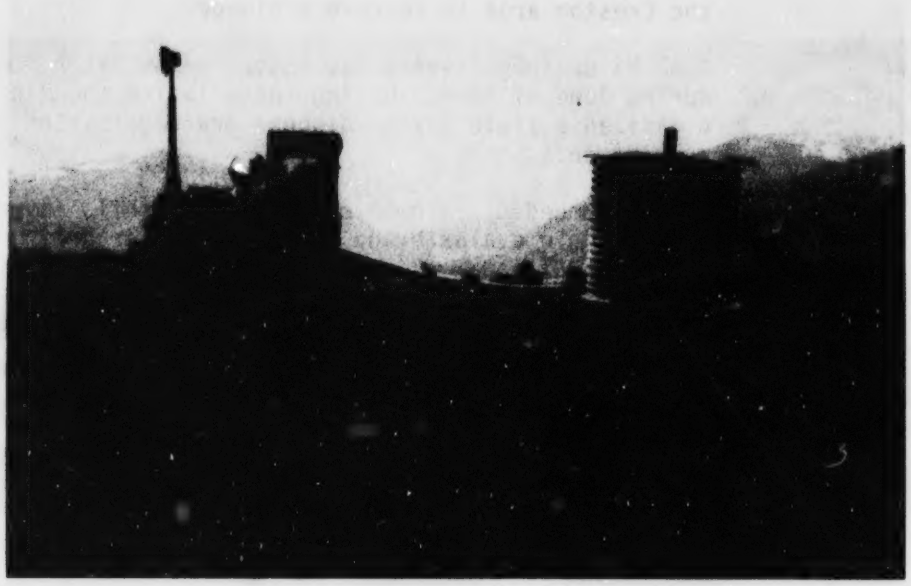
	Zero		Conventional	
	kg/ha	bu/ac	kg/ha	bu/ac
Dawson Creek	1,593	23.7	1,646	24.5
Fort Nelson	1,975	29.4	1,870	27.8
Dawson Creek 1983				
Fall rye-Kodiak	4,384	69.6	2,875	40.4
Winter wheat-Norstar	1,903	28.5	1,743	21.1
Dawson Creek 1984				
Winter wheat-Norstar	2,582	38.4	1,990	29.6

In the fall of 1984, both Norstar winter wheat and Kodiak fall rye were planted on zero and conventional till and treated with a heavy rate of Vitavax.

Temperatures will be monitored during the winter on both zero and conventional-till to better understand and assist in separating damage caused from cold temperatures and from snow mould.

An additional small plot trial was seeded including treatments Norstar and Kodiak with Vitavax or Baytan at zero, normal and 2.5 times normal rates at four different seeding dates.

DEMONSTRATION OF SUBSURFACE DRAINAGE ON CRESTON FLATS



Installation of subsurface drainage pipe

Project Number:	122
Supervision:	John Metzger, Agricultural Engineer, Abbotsford
Co-operators:	Peter Kemp, Farmer, Creston Flats; Martin Driehuyzen, Drainage Specialist, BCMAF; Brian Laing, District Agriculturist, BCMAF; Greg Tegart, Field Crops Specialist, BCMAF; Inglis Farm Drainage, Subsurface Drainage Contractor; Daymond Manufacturing, corrugated plastic tubing manufacturers
Branches:	Engineering
Funding:	D.A.T.E. 1984-85 - $1,400
Objectives:	To demonstrate and evaluate the benefits of a properly designed and installed subsurface drainage system on the Creston flats.
Summary:	Much of the Creston flats have been reclaimed through dyking which provides flood protection and regional drainage system outlets.

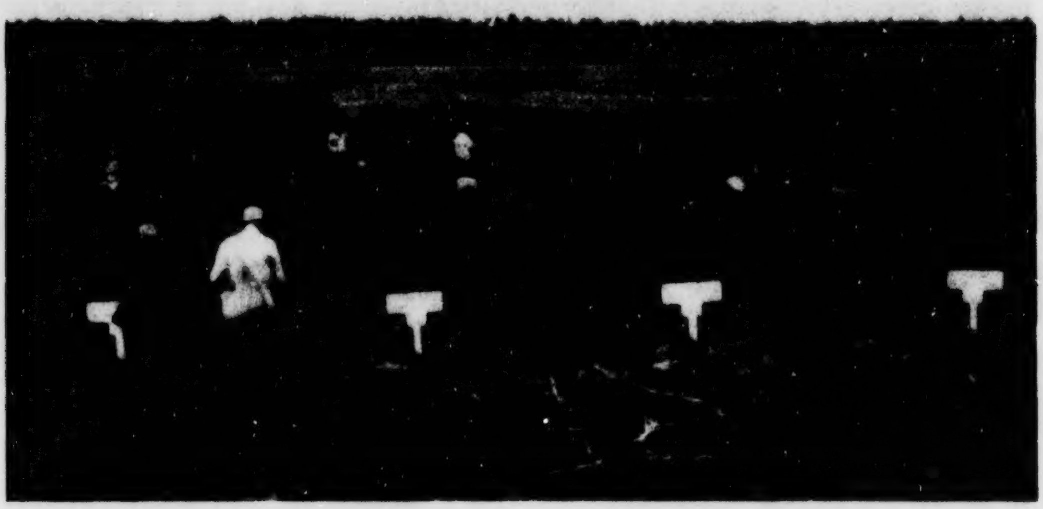
Due to the fine soil texture, the distances between drainage ditches and level topography, on-farm land drainage is slow. To date farm scale subsurface drainage has not been used in the Creston area to improve drainage.

A 50 ha drainage system was installed on Peter Kemp's farm during June of 1984. During installation the Ministry organized a field day to discuss drainage system installation requirements.

The recommended drain spacing based on soils investigations is 30 m. To evaluate the effect of closer drain spacing several additional pipes were installed resulting in 15 m spacing. Subjective evaluation by Ministry staff and the farmer of the benefits of drainage will take place in subsequent years. Expected benefits include:

- increased crop productivity
- longer growing and harvest season
- greater cropping choice and flexibility
- potential to sub-irrigate
- improved soil structure
- increased land value.

EVALUATION OF LIME ADDITIONS FOR FORAGE CROP PRODUCTION IN THE CENTRAL INTERIOR



A field day was held to show farmers how alfalfa responds to lime.

Project Number:	124
Supervision:	R. Kline, Soils Specialist, Prince George
Co-operators:	William van Leirop, Soil and Feed Testing Laboratory, BCMAF, Norman Johnson, Dairy Farmer; Alf Nunweiler, Beef Producer; Joe Utz, Beef Producer; Larry Bell, Beef Producer; Dave Merz, Beef Producer; Floyd Jackson, Beef Producer
Branches:	Soils
Funding:	D.A.T.E. 1983-84 - $1,800
Objectives:	To evaluate alfalfa response to lime additions on several acid soils in Central B. C. To evaluate the SMP buffer pH method of lime requirement predictions for Central B. C. soils.

Summary:

Alfalfa was seeded in the spring of 1984 on four of six sites. Establishment was good on all plots, but growth was poor on three sites, resulting in no harvest. Response of alfalfa to lime was particularly strong on Pineview soils (N. Johnson farm). A field day was held to show how alfalfa responds to lime. At present, lime cannot be considered economically feasible when applied at high rates, or at high tonnage costs, to Pineview soils. Other acid soils (Fraser, Bednesti series), which have lower lime requirements, may be feasibly limed if costs were kept to a $30 per tonne range.

Alfalfa yield results from the Johnson dairy farm for two rates of lime were:

Target pH	Mean Yields (Kg/ha DM)
5.5	1,425
6.0	2,097
6.5	2,240

Where no lime was applied alfalfa was a pale green color, and had delayed maturity. Alfalfa on the limed plots was healthy and vigorous.

The trials are to be continued for the next 2 to 3 years to evaluate the effect of lime on winter survival, especially on the coarser textured soils in this study.

The SMP buffer pH method of predicting lime requirements to achieve pH's of 6.0 and 6.5 is effective for central British Columbia's agricultural soils. Field tests indicate that pH levels have almost stabilized at the target levels within one year of lime application using Ca(OH) .

GRAPE VARIETY EVALUATION ON VANCOUVER ISLAND

A field day attracted 150 people to the vineyard.

Project Number:	125
Supervision:	J. Vielvoye, Provincial Grape Specialist, Kelowna
Co-operators:	B. Warner, Horticulturist, BCMAF; E. Schulz, Agricultural Engineer, BCMAF; D. Zanatta, land owner, Duncan
Branches:	Regional Extension Services, Okanagan-Kootenay Region
Funding:	D.A.T.E. 1984-85 - $3,500
Objectives:	To determine the suitability of 32 grape varieties to an area of Vancouver Island, and to install a drip irrigation system.
Summary:	Grape varieties planted during the summer of 1983 at this site generally grew well, but did not mature prior to winter and there was some winter damage (1983/84) (-15°C at this site) to the immature wood. Although some vines were late to leaf out, generally all varieties recovered well. Supplemental water via a drip irrigation system was installed during the early summer. As a result, grape vines grew very well in 1984, showing no signs of stress due to drought.

There was no fruit production in 1984, although vines grew large enough to completely fill the trellis space provided. Wood maturation in 1984, prior to winter conditions, varied by variety, but in general should be adequate to produce a small commercial crop in 1985.

A field day in August, 1984 attracted in excess of 150 visitors to the site. Grape varieties, drip irrigation and a deer fence, also installed during the early summer, were shown and discussed with visitors.

TESTING CALF SCOURS VACCINE IN THREE HERDS

Cathy James, Veterinary student, vaccinating a calf

Project Number:	129
Supervision:	Dr. J. Greenfield, Veterinary Microbiologist, Abbotsford; Cathy James, Veterinary student
Co-operators:	Dr. R. Walton, Supervisor, Veterinary Field Staff, BCMAF; Elisabeth Jahren, Veterinary student; W. McCabe, Dairy Farmer, Aldergrove
Branches:	Veterinary
Funding:	D.A.T.E. 1984-85 - $11,170
Objectives:	To demonstrate the protection given to cattle by vaccination with a new Salmonella vaccine.

Summary:

Salmonellosis is an intestinal disease of animals and poultry, while Salmonella contaminated food-stuffs cause food poisoning outbreaks in man. Young calves are particularly susceptible to Salmonella infections and the disease can cause severe economic losses to livestock producers. Antibiotic treatments are rarely successful and in the past, vaccination procedures have not been protective. A virus-selected, low virulence Salmonella strain developed at the Veterinary Laboratory was made into a vaccine. Vaccination of a dairy herd produced a very high specific response (serum titre herd mean +900). Adverse effects (e.g. febrile and local responses, etc.) were minimum.

In a limited second study, vaccinated week-old calves were protected when challenged two weeks later with a virulent field strain of Salmonella, whereas all unvaccinated challenged calves died.

The new vaccine shows great promise as a protective measure against Salmonellosis. Additional adequate field testing is required to determine whether the new vaccine protects against natural Salmonella infection in cattle.

POULTRY HEALTH PROGRAM

A laboratory technician monitors poultry health.

Project Number:	130
Supervision:	D. Hamilton, Poultry Supervisor, Abbotsford
Co-operators:	Dr. John Robinson, Avian Pathologist, Veterinary Branch, BCMAF; Dr. R.C. Hopkins, Avian Disease Veterinarian, Veterinary Branch, BCMAF; H. Gasperdone, Broiler Specialist, BCMAF; B.C. Chicken Marketing Board
Branches:	Livestock Branch, Poultry Program, Veterinary Branch
Funding:	D.A.T.E. 1982-83 - $17,500 D.A.T.E. 1983-84 - $ 6,000
Objectives:	In co-operation with the poultry industry to maintain a serological monitoring laboratory to determine the efficiency of vaccination programs in broiler breeder flocks; as well, to monitor these flocks for pathogens.

Summary:

A monitoring laboratory was set up in the summer of 1983 and over the ensuing year more than 100 broiler breeder flocks were tested. Day-old chicks are sampled for Salmonella at the time the flock is placed, and mycoplasma testing done at that time. When the flock is 11 weeks old and again at 22 weeks old, blood samples are taken.

By various serological tests these bloods are tested for mycoplasma and five viruses. The resulting antibody titers indicate if the farm's vaccination program is successful in protecting the breeders against avian diseases. Very high titers are desirable at 22 weeks of age and older since the breeders must pass sufficient maternal antibodies to the broiler chicks to protect them during their first weeks.

Results from the laboratory assist the veterinarians and specialists in making recommendations regarding changes in vaccination programs and management. In this way large financial losses suffered by the poultry industry due to avian diseases should be reduced.

Equipment purchased this year from D.A.T.E. funds greatly increased the number of sera that can be handled in the laboratory. This is an ongoing co-operative program in that the staff is hired by the Chicken Marketing Board and supplies are provided by Ministry of Agriculture and Food budgets.

GLOBE ARTICHOKE TRIAL IN GOLDEN NEMATODE QUARANTINE AREA

Project Number:	131
Supervision:	G.B. Warner, District Horticulturist, Sidney
Co-operators:	Plant Quarantine and Research Station, Agriculture Canada, Sidney; Dan Ponchet, Le Coteau Farms, Victoria
Branches:	Regional Extension Services, South Coastal
Funding:	D.A.T.E. 1984-85 - $250
Objectives:	To evaluate the potential of limited production of globe artichokes on Vancouver Island for local fresh market consumption. Yields were taken in the summer of 1984 and will also be recorded in 1985. A sawdust mulch will be applied to the plants to protect them in the winter of 1984-85.

Summary: Due to the extremely cold and wet conditions in the spring of 1984, the plants were very slow to establish and did not begin to produce buds until August. For this reason, bud production was down to an average of only 4 buds per plant on the best variety, which was 1.5 buds below last year's production. This reduction in yield would have serious consequences for potential growers in cool, wet years. However, the real potential for this crop rests with the ability for it to over-winter here in normal winters. Next year will be the year which proves whether globe artichoke production in the area is viable.

One local farmer, who has established a small planting of forty plants on his farm, has had good luck with the plants and had no problem selling the buds which were produced.

Results of this trial were to be presented at the annual Growers' Update at the Saanichton Research Station.

DEMONSTRATION OF FLOATING MULCHES TO PRODUCE VEGETABLES EARLIER

Project Number: 132

Supervision: M. Sweeney, District Horticulturist, Abbotsford

Co-operators: Fred Maurer, Vegetable Physiologist, Agassiz Research Station; Jim Conroy, Horticulturist, BCMAF; Several Fraser Valley vegetable growers

Branches: Regional Extension Services, South Coastal Region

Funding: D.A.T.E. 1984-85 - $300

Objectives: To demonstrate to Fraser Valley vegetable growers various types of floating mulches which can be used to promote an earlier harvest.

Summary: For some vegetable crops, growers can obtain the best price by harvesting earlier than the traditional local season. A floating mulch is a perforated film, usually polyethylene, which is applied over the seeded or transplanted crop and is lifted up and supported by the crop as it grows. This technology is widely used in Europe on many vegetable crops and is reported to advance harvest date by 10 to 20 days.

Two types of mulches, Xiro - a Swiss-made slitted polyethylene; and Reemay - a spun bond polyester material were evaluated on rhubarb, cauliflower, parsnips, sweet corn, zucchini and cucumbers. Xiro proved to be the more effective material advancing maturity by 10 to 14 days. Reemay was much less effective as maturity was advanced by only 3 to 7 days. Although they advance harvest, cost of these mulches is prohibitive for some crops. Less expensive materials will also be evaluated in 1985.

AGRONOMIC FACTORS AFFECTING FORAGE QUALITY AND UTILIZATION

Project Number: 133

Supervision: Al McNeil, Livestock Specialist, Prince George

Co-operators: Mike and Ann Migvar, Punchaw Region, Prince George; Jack Pinder, Prince George; George Kellett, Prince George; Dr. Malcolm Tait, U.B.C.; Dr. Lyle Rode, Agriculture Canada, Prince George

Branches: Livestock

Funding: D.A.T.E. 1984-85 - $9,700

Objectives:

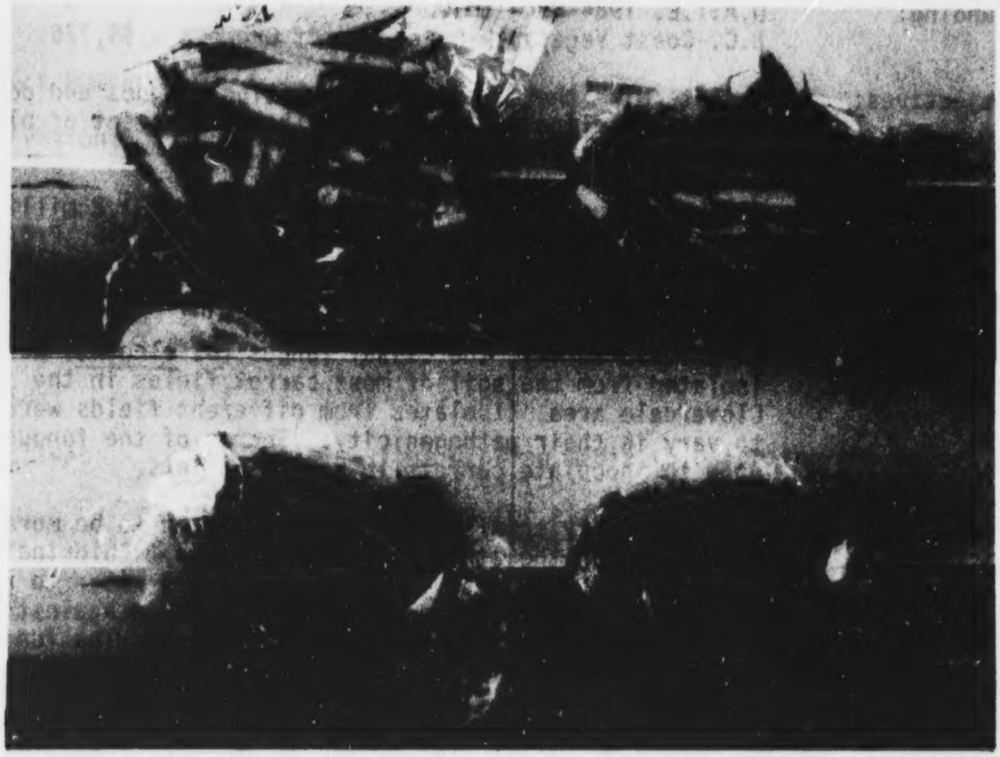
1. To evaluate differences in forage quality between species and varieties currently grown in central British Columbia.
2. To evaluate the feed values of an alsike clover-grass and a red clover-grass mix harvested at 3 growth stages.

Summary: Forage quality is a major constraint to livestock production in the central interior of British Columbia. In the past, much work has been done on forage crop yields, however, little work has been done on the nutritive aspects of forages. Improvements in forage quality can significantly increase livestock performance, while at the same time decreasing feed costs.

In early spring of 1984, 185 samples were selected to evaluate differences in forage quality between species and varieties. These samples consisted of three years growth of four alfalfa, four legume, four Timothy and four orchardgrass varieties. This material was ground and a portion sent to the Soil, Feed and Tissue Testing Laboratory in Kelowna for determination of crude protein and acid detergent fibre (ADF). The sample material retained in Prince George is, at the time of writing, being analyzed for dry matter weight, neutral detergent fibre (NDF) and nylon bag dry matter disappearance determinations.

Concurrent with this work, a feed intake and digestibility trial is being conducted to look at how two different forage mixes (alsike clover-Timothy and red clover-Timothy) each cut at three different stages (10%, 50% and 100% bloom) are used by the animals. Seven wether lambs were purchased on June 30, 1984 and roughly 500 kgs. of each of the six hay cuts was collected between July 10 and August 15. The lambs were introduced to the metabolism crates four weeks prior to the start of the trial which began on August 20, 1984. The design of the intake and digestibility trial requires six three-week feeding periods so each of the six sheep on test receives one of the hay cuts sometime during the trial. At the time of writing three of the six test periods have been completed. In addition to weighing the feed and feces, samples of each are being analyzed for NDF, ADF and crude protein to determine how the feedstuffs are being utilized by the animal. The trial and laboratory analysis was to be completed early in 1985 after which a statistical review and examination of the results was to be made.

CONTROL OF CARROT BLACK ROT IN STORAGES



Carrots washed, cooled and bagged immediately after harvest (top), compared to carrots held for 24 hours before washing, cooling and packaging

Project Number: 135

Supervision: D.J. Ormrod, Plant Pathologist, Cloverdale

Co-operators: S.G. MacDonald, Student Assistant, BCMAF; J.F. Conroy, Vegetable Specialist, BCMAF; P.W. Perrin, Research Scientist, Agriculture Canada; G. Sprangers, L. Law, P. Garvin, A. Stetar, G. Cowland, T. Warhurst, B. Wong and B. Wisbey, carrot growers

D.A.T.E. PROGRAM REPORT 1984

Branches: Crop Protection

Funding:
D.A.T.E. 1984-85 - $4,000
B.C. Coast Vegetable Co-op Carrot Growers - $4,776

Objectives: To determine the effect of inoculation methods and post-harvest handling and storage on the development of black root rot in fresh market carrots.

Summary: Black root rot caused severe losses in the $1.2 million carrot crop in 1979 and again in 1982. D.A.T.E. Project #135 was set up in 1984 to investigate ways of preventing the reoccurrence of this disease.

In a field survey, the causal fungus (*C. elegans*) was isolated from the soil of most carrot fields in the Cloverdale area. Isolates from different fields were found to vary in their pathogenicity. Spores of the fungus were used to inoculate carrots in various trials.

In the variety trials, Six Pak II appeared to be more tolerant than the other popular varieties. Chlorination was found to be beneficial in the hydrocooling water to reduce inoculum. The effectiveness of chlorination against spores on the carrot surface is still in question. The fungus was unable to grow on inoculated carrots that were held below 7°C.

Washing and cooling the carrots as quickly as possible after harvesting greatly reduced the amount of rot. Carrot temperature readings were taken at various stages of the packaging operation at the B.C. Coast Vegetable Co-op to determine how well the carrots were being cooled by the newly installed hydrocooler in comparison with temperatures recorded in 1983 when no hydrocooling was available.

Still to be clarified in the 1985-86 season are:

- the role of virulent strains in outbreaks
- varietal resistance under lower inoculum pressure
- appropriate levels of chlorination to control chlamydospores in the hydrocooling water
- precise minimum temperature for growth of the pathogen and
- investigation of biochemical resistance of the carrot epidermis as it is affected by temperature.

BIOLOGICAL CONTROL OF ROOT AND STEM ROTS OF CUCUMBERS GROWN IN ARTIFICIAL MEDIA

Project Number:	136
Supervision:	Brian Mauza, Provincial Greenhouse Specialist, Agriculture and Food Centre, Abbotsford; Dave Ormrod, Plant Pathologist, Cloverdale
Co-operators:	Dr. Jim Rahe, Simon Fraser University; Rob Favrin, research assistant
Branches:	Crop Protection, Field and Special Crops
Funding:	D.A.T.E. 1984-85 - $8,000
Objectives:	To sample various growing media to determine the reason for different levels of soil-borne disease problems. To evaluate antagonist organisms for effectiveness in reducing the incidence of cucumber root and stem rot.
Summary:	This disease posed a problem for growers in 1984 crops. Cultures of an organism thought to be responsible have been isolated. Mr. Favrin has been contracted to continue with this isolation of the disease organisms and to test a known antagonist *Trichoderma harzianum*, against the pathogen(s). If preliminary trials with the antagonist are encouraging, then trials in commercial ranges will be set up for the 1985 crop of long English cucumbers.

THE SIGNIFICANCE OF NEMATODES IN APPLE REPLANT DISEASE AND POOR GROWTH OF YOUNG FRUIT TREES

Old orchard land should be sampled before replanting.

Project Number:	137
Supervision:	J.M. Yorston, Plant Pathologist, Summerland
Co-operators:	T.C. Vrain, Nematologist, Agriculture Canada Research Station; B.C. Fruit Growers' Association, Kelowna; T. Murton, summer student
Branches:	Crop Protection
Funding:	D.A.T.E. 1984-85 - $8,500

Objectives: To determine if soil borne, plant parasitic nematodes are causing poor growth of fruit trees and are a factor in apple replant disease.

Summary: Poor growth of young apple trees replanted in old orchard soil is a common problem in British Columbia orchards. Factors known to cause this problem include poor weed control, acid soil conditions and various soil fungi. In other areas, nematodes have been shown to severely stunt the growth of young fruit trees. The root lesion nematode (*Pratylenchus penetrans*) has been identified as causing problems in British Columbia tree fruit nurseries. To correct this problem the nurseries are now routinely fumigating their soil prior to planting. The objective of this study is to see if we have this nematode problem in our orchards as well and if the nematode is causing poor tree growth.

The results show that high levels of nematodes do occur in a few Okanagan orchards. Of 194 samples taken, 14 had the combination of high nematodes and poor tree growth. However, there were 18 other samples with poor tree growth, but low nematode levels. This indicates that in over one-third of the cases where trees are growing poorly, nematodes are a factor. Nineteen other samples were found with high nematode levels but no stunting of tree growth. Most of the trees in this category were old. Nematodes do not seem to damage the older trees but there could be a problem when the old trees are pulled out and new trees planted in the site. Overall, two-thirds of samples taken had either no nematodes or levels too low to be of concern.

The conclusion of this study is that orchardists should sample their old orchard land for nematodes before replanting and consider one of several soil fumigation methods before replanting if nematode levels are high.

HAY ADDITIVE TESTING

A large square-baler has applicators mounted so that additives can be metered on to the hay during the baling process.

Project Number:	138
Supervision:	G. Strachan, District Agriculturist, Kamloops
Co-operators:	Dr. Lorne Fisher, Agriculture Canada; Scott McComb, Walhachin Ranches, Walhachin; George Mitchell, Rancher, Barriere; Dave Chutter, Chutter Ranch, Merritt; Peter Falsetta, Technician, BCMAF
Branches:	Regional Extension Services, Thompson-Cariboo Region
Funding:	D.A.T.E. 1984-85 - $2,000

Objectives: To assess the value of three powdered hay preservatives in preventing wet and mold damage which usually occurs when hay is baled at moisture levels beyond 15 percent.

Summary: The longer the time period that hay is left in the field to cure after cutting, the greater the risk of damage caused by poor weather. Hay which has been rained on may result in additional costs associated with raking and will in almost all cases have a reduced feed value.

The additives used in the trial each claim to prevent the mold and heat damage in hay when baling is done at moisture levels of up to 25 percent. The ability to bale at these higher moisture levels would be a benefit to the hay grower by reducing both the curing time required and the risk of weather losses.

Three powdered hay additives, Silo-King plus, Silo-Guard and Nap-Hay-Mate were each tested on three haying systems: conventional square bales, large round bales and large square bales. The treated bales, in addition to control bales, were all sampled after treatment and again between 6 and 8 weeks later. The samples will be tested through Agriculture Canada for protein levels, heat damage to protein and soluble carbohydrates. Differences in readings over the 6 to 8 weeks between sampling will give an indication of the effectiveness of the products. In addition to differences in feed analysis values, a visual assessment for the presence of molds and heat damage will be made during the winter when the hay is fed to livestock.

STUDY TOUR OF TREE FRUIT PRODUCTION IN EASTERN CANADA, THE UNITED STATES AND EUROPE

Project Number: 139

Supervision: Brian Hodge, Regional Director, Okanagan-Kootenay Region, Summerland

Co-operators: Tim Watson, District Horticulturist, BCMAF

Branches: Regional Extension Services, Okanagan-Kootenay Region

Funding: D.A.T.E. 1984-85 - $10,500

Objectives: To study and observe advanced high technology apple production areas.

Summary: Eastern Canada and Eastern United States

High density orchards were visited and discussions held with extension and research personnel in Ontario, Quebec, Michigan, Ohio, Pennsylvania, New York and Massachusetts in the last two weeks of September and the first week of October, 1984.

When new orchards are established or replanting is carried out, the trend is to more intense planting systems, especially in Ontario, Quebec and New York State. In some instances closer plantings are contemplated, but an additional incentive is required to make the changes, such as increased competition in the apple market. Research information on evaluating training systems and planting densities in the eastern areas can be applied to our situation in British Columbia.

A tree density of 1500 to 2000 trees per hectare is common in intense plantings in the east. A minimum yield of 750 boxes per hectare is expected in the third year. Maximum yields of 2400 to 2700 boxes per hectare are produced. These yields can often be achieved in the seventh year.

In Ontario, there are excellent examples of spindle trained apple plantings. Much of this technology has been adopted from systems used in Europe.

Most of the high density plantings in New York are interstem plantings. The most widely used is a M106/M9 combination. There is a significant number of trellised and individually supported plantings also.

Quebec has a substantial acreage of new intense plantings. The central axis training system developed in France is used in some of these plantings. A modified spindle training system is also used in Quebec.

A number of advantages to high density planting systems are evident, the most important being early production, early financial return and better quality. Cultural operations are easier and cost less in high density systems.

The value of more intense planting systems is evident. British Columbia orchardists should be encouraged to adopt early production and high density planting techniques.

Europe

This study tour of England, Holland, Germany and France was undertaken to study rootstocks, spacings and systems used in these countries which have techniques more productive than those used in British Columbia.

The advantages of Slender Spindle are early production, high production at maturity, easy to work because of small tree size, and less time required than large trees. Disadvantages are high start-up costs for trees and posts, management skill required and hand labour required.

The unknowns for British Columbia are spacing, rootstock height, rootstock, adaptability for spur-type strains, spring and frost danger.

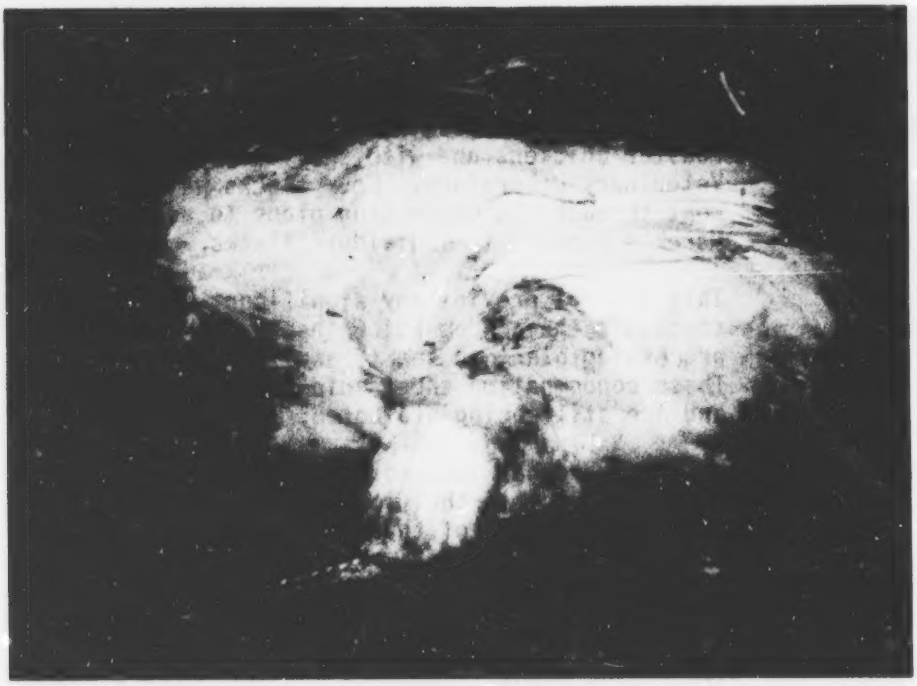
The advantages outweigh the disadvantages, and this system has potential for British Columbia, but research is needed.

In France the Central Axe training system was examined. This system requires very little cultural management in the early years as compared to any other system, and even less time as the trees mature. Early production can be as high as Slender Spindle if comparable trees are planted and production at maturity is likely to be higher as taller trees are grown.

The main unknowns under British Columbia conditions are the rootstocks, spacings and varieties, but the system definitely warrants trial.

In each country considerable attention was paid to the subject of tree quality and nursery practices which provide high quality nursery trees. With all systems tree quality is imperative for success. Tree quality in British Columbia has been inconsistent and if the European systems are to be successful in British Columbia, improved nursery trees are required. Research, demonstration and educational programs will be required.

EVALUATION OF MAREK'S DISEASE CONTROL TECHNIQUES IN POULTRY



Chicken with Marek's disease.

Project Number:	141
Supervision:	Dr. Peter Hewitt, Acting Director, Veterinary Branch, Abbotsford
Co-operators:	B.C. Chicken Marketing Board, Cloverdale
Branches:	Veterinary
Funding:	D.A.T.E. 1984-85 - $9,000
Objectives:	The Chicken Marketing Board voiced concern that condemnations at the poultry processing plants due to apparent Marek's Disease (a cancer-like condition caused by a virus infection) were, in British Columbia, two and one-half times the national average.

This program was to evaluate these losses and the Marek's Disease Vaccination procedures and management practices. To tabulate losses to see if any particular flocks, growers or hatcheries are involved, and provide recommendations for control.

Summary: Discussions were held with several producers of broiler and roaster chickens and with the Poultry Pathologist at the Veterinary Laboratory. Four flocks were examined as they went through the processing plant to assess the incidence of Marek's Disease in individual flocks.

This did not provide any significant data so it was decided to obtain the condemnation sheets for each flock from each processing plant to see if any significant pattern evolved. These condemnation sheets did not start arriving until August and are still being evaluated.

So far there has been no serious condemnations for Marek's Disease in any of the flocks that went through the plants during the period of this study.

Some interesting statistics are being obtained and these briefly are:

1. At one plant, condemnations for Marek's Disease were 3.7% whereas condemnations for what was classified as "skin condition" was 14.3%. In another plant, condemnations of 1.2% and 13.9% respectively were tabulated. In two other plants, condemnations for "skin condition" and Marek's Disease were about equal.
2. In a comparative study Chronic Respiratory Disease (CRD) and arthritis were tabulated against Marek's Disease condemnations. At two plants, condemnations for arthritis were 9 times those for Marek's Disease in one case and 3 to 1 respectively in the other.
3. It would appear that CRD condemnations in British Columbia are twice the national average and for dermatitis (a skin condition which could be confused on cursory examination with the skin form of Marek's Disease) was three times the national average.

As a result of this, a recommendation is being made to the B.C. Ministry of Agriculture and Food and the B.C. Chicken Marketing Board that a comprehensive computer study of condemnations at the processing plants be conducted during 1985.

CONTROL OF INTERNAL PARASITES IN BEEF AND DAIRY CATTLE

Project Number: 142

Supervision: Dr. R. E. Clugston, Veterinary Pathologist, Abbotsford

Co-operators: Dr. Wm. Cox, Calgary

Branches: Veterinary

Funding: D.A.T.E. 1984-85 - $6,250

Objectives: To determine the effect of anthelmintic treatment using a sustained release bolus on beef and dairy cattle by determination of:

a) fecal parasite egg counts;
b) weight gains; and
c) gastrointestinal parasite populations on pasture.

Summary: Test and control animals were weighed every 28 days from April through September. Fecal parasite egg counts and pasture larvae counts were determined on samples collected at each weigh period. In addition to this controlled experiment, fecal parasite egg counts were determined on samples from two other herds on a clinical anthelmintic treatment trial.

Anthelmintic treatment by sustained release bolus resulted in:

a) reduced fecal parasite egg counts
b) reduced pasture parasite larvae counts and
c) increased body weights.

These results are being evaluated on computer by Dr. Cox, Rogar STB as to their statistical significance.

FABABEANS FOR HIGH PROTEIN SILAGE PRODUCTION ON VANCOUVER ISLAND

Fababean Harvest

Project Number: 143

Supervision: M. F. Betts, Field Crops Specialist, Sidney

Co-operators: Allen Looy, Farmer, Errington; Agriculture Canada Research Station, Sidney

Branches: Regional Extension Services, South Coastal Region

Funding: D.A.T.E. 1984-85 - $1,500

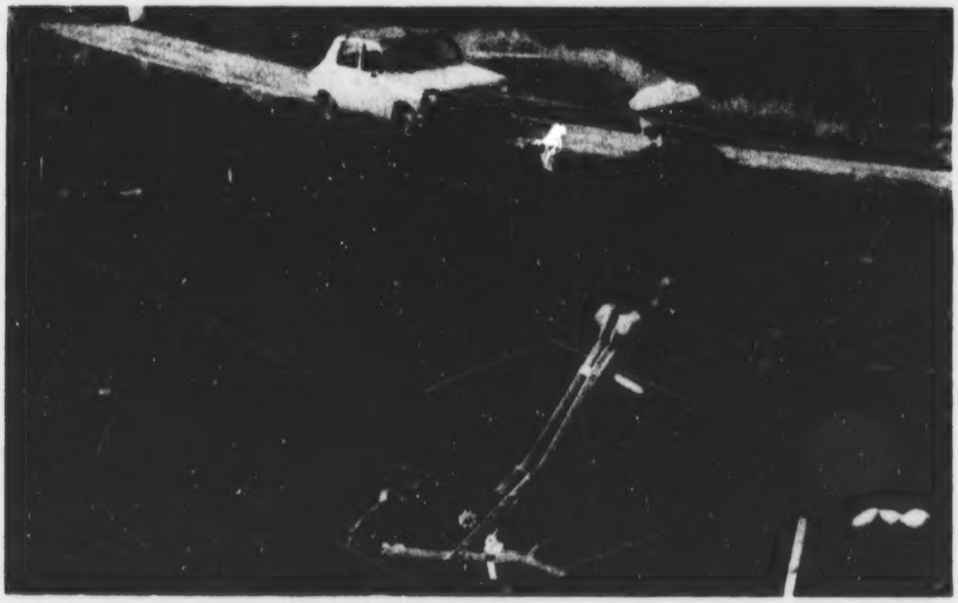
Objectives: To evaluate the potential of fababeans for production of high protein silage to be used as a supplement to corn silage.

Summary: Dairy farmers in South Coastal British Columbia annually import thousands of tons of alfalfa hay to supplement livestock feeds. A possible substitute for alfalfa hay could be fababean silage, which ranges from 16-20% crude protein with a digestability of 64-75%. Alberta and Manitoba have successfully produced fababeans for seed and silage for several years and research at Mount Vernon, Washington indicates some success with fall seeding. On June 19, 1 and 0.5 hectares of Hertz Freya and Ackerperle fababeans respectively, were seeded at Errington, B.C. A tank mix of Treflan and Sencor was used for weed control and the field was fertilized with phosphate and potash.

Planting was late due to very wet spring weather, but a reasonable stand of fababeans was established. Some minor problems were encountered, including pigeon damage to young seedlings, ascochyta blight, drought and lack of proper harvesting equipment. Dry weight yields, from one square metre samples taken on September 28, went as high as 15,045 kg/ha. This is a relatively good yield, considering the short growing season this year and that drought was a problem during the summer. Generally, pod formation was good and root nodulation for nitrogen fixation was excellent. Under better moisture conditions and a longer growing season, it is anticipated that yields would be substantially higher.

A fall seeding trial has been established on the Agriculture Canada Research Station at Sidney, seeding at one week intervals for six weeks beginning September 19. The success of this planting will be determined in the spring of 1985.

DEMONSTRATION AND EVALUATION OF VEGETABLE SEEDING AND PLANTING PRACTICES IN THE PEACE RIVER, PRINCE GEORGE AND SMITHERS AREAS



Fall seeding requires good timing.

Project Number:	144
Supervision:	G.S. Emmond, Regional Horticulturist, Prince George
Co-operators:	John Curtis, Vegetable Grower, Taylor; R. Tutte, D. Cowie, Vegetable Growers, Prince George; Hildo Hoek, Vegetable Grower, Smithers; John Bahr, Vegetable Grower, Terrace
Branches:	Regional Extension Services, Central Region
Funding:	D.A.T.E. 1984-85 - $2,410
Objectives:	To evaluate early maturity and yield of vegetables: 1) directly fall seeded, fluid spring seeded and normal spring seeded 2) grown under hot tents, floating mulch, slitted plastic tunnels and on bare ground and 3) grown on black plastic, clear plastic and on bare ground.

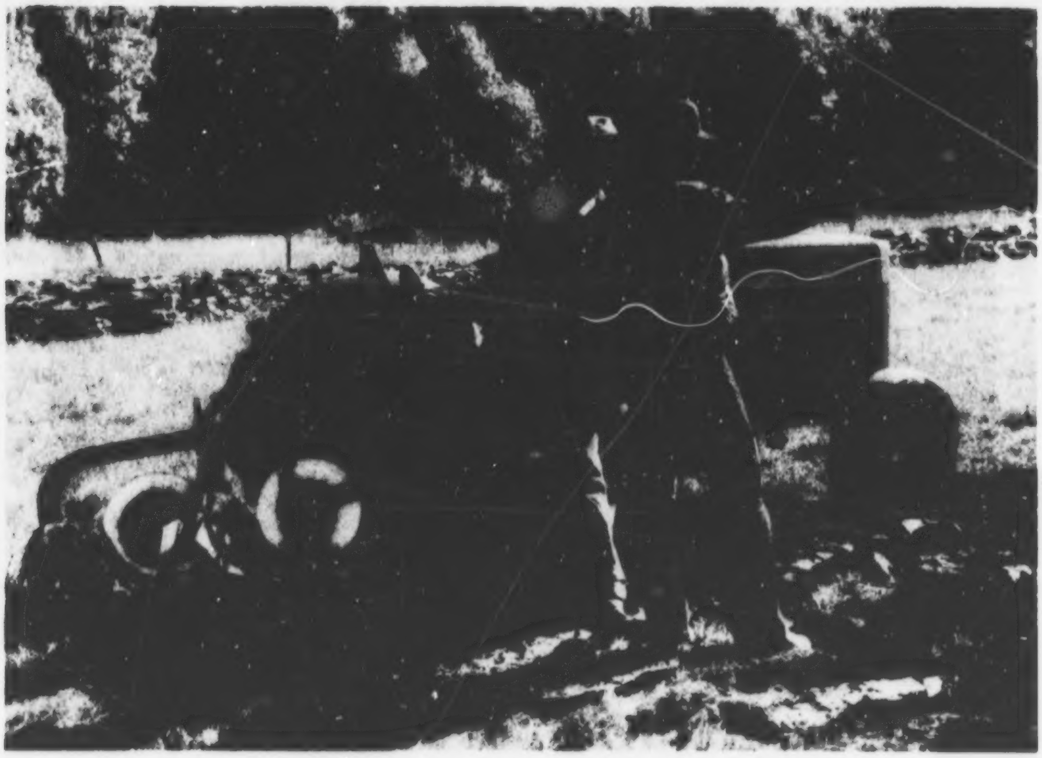
Summary:

Higher vegetable prices are generally received early in the harvest season. Vegetable producers using cultural methods that promote early maturity frequently receive higher returns for produce. Fall seeding, fluid seeding, the use of hot tents, plastic tunnels and mulches have been used to produce crops earlier in the season.

Fall seeding requires exact timing as weather and soil conditions must be suitable for seeding and yet cold enough to prevent seed germination. In 1984 the unexpected prairie winter storm that swept into the Peace River region prevented the planting of the fall seeding plot at Taylor, however, the Prince George plot was planted. Fall-seeded vegetables were: one variety of beets, broccoli, cauliflower, celery, bunching onions, parsnips, spinach and summer turnips and two varieties of cabbage, carrots, lettuce, storage onions and peas.

Spring operations will proceed as planned in all locations.

EVALUATING COMMUNITY PASTURE RENOVATION SYSTEMS



Discussion of fall plowing with contractor

Project Number:	146
Supervision:	Erich Schulz, Engineering Technician, Victoria
Co-operators:	Garth Elgie, District Agriculturist, BCMAF; Jim Tingle, Field Crops Specialist, BCMAF; Rob Kline, Soils Specialist, BCMAF; W/M Community Pasture, Prince George
Branches:	Engineering
Funding:	D.A.T.E. 1984-85 - $ 3,450 D.A.T.E. 1985/86 - $22,950

Objectives: To determine most appropriate methods to renovate pastures that have become sod-bound after numerous years of use.

Summary: An 80-acre parcel of land at the W/M community pasture was divided into 12 plots so that 11 treatment methods could be compared to one check plot. A number of initial treatments have been completed in the fall of 1984 with subsequent and other treatments to be done in the spring and summer of 1985.

The blocks and the treatments are as follows:

I - Fall plowing with fall farm discing.
- Spring discing, harrowing and seeding.

II - Summer Round-up with subsequent discing and seeding with the BCMAF Rangeland equipment.

III - Fall plowing.
- Spring rotovating, harrowing and seeding.

IV - Fall double discing with breaking disc.
- Spring cultivating or discing, harrowing and seeding.

V - Spring plowing and farm discing.
- Summer discing, harrowing and seeding.

VI - Spring discing with breaking disc.
- Summer discing and seeding with BCMAF Rangeland equipment.

VII - Spring rotovating, plowing, discing, harrowing and seeding.

VIII - Summer Round-up and seeding with Interseeder.

IX - Fall plowing.
- Spring discing, harrowing and seeding.

X - Summer Round-up and seeding with heavy conventional seed drill.

XI - Check plot.
- One-half of plot to be used as fertilizer trials.

XII - Fall aeration with Aer-way, two passes.
- Spring aeration with double pass on one half and single pass on other half. Some seeding and fertilizing treatments will also be carried out.

Renovation cost methods will be compared to yield results to determine the most cost effective and optimum method of treatment.

INTENSIVE ROTATIONAL GRAZING IN THE PEACE RIVER REGION

A hayfield was fenced into pasture units.

Project Number: 147

Supervision: J.R. Green, Pasture Agrologist, Dawson Creek; J.R. Breault, Summer Student, Dawson Creek

Co-operators: Steve Mason, Provincial Sheep Specialist, BCMAF; Keith Carroll, Field Crops Instructor, Northern Lights College, Dawson Creek; Kathy Sandy, Assistant District Agriculturist, BCMAF; Lyle Gerwien, Farm Manager, Northern Lights College, Dawson Creek

Branches: Regional Extension Services, Peace River Region

Funding: D.A.T.E. 1984-85 - $3,300
D.A.T.E. 1985-86 - $ 500

Objectives: To evaluate the productivity of intensive rotational grazing as compared to continuous grazing in terms of sheep gain, pasture longevity and long and short term economics.

Summary:

A three hectare alfalfa (10%) - bromegrass (90%) hayfield was fenced into pasture units, then on June 7th, 40 dry Suffolk and Hampshire ewes were released into each pasture after being sorted according to weight and age. All sheep were weighed at 2-week intervals until October 1st, when they were removed. One group grazed an area on their own (i.e. continuous) while the other flock were moved to a new area of their pasture every 1 to 3 days (rotationally) depending on forage growth. Forage cages were placed on both areas and photos were taken each time the sheep were moved to show the regrowth before and after grazing. Yields were taken on an adjacent, ungrazed area to determine the yearly growth curve.

Both areas had been fertilized in early May and again during mid-July.

Twenty ewes were removed from each pasture on July 10th because of the reduction in growth after the June "flush". The two flocks were re-sorted on August 16th in preparation for breeding. Rams were added September 10th. This meant there were two separate weigh periods, a 70-day followed by a 46-day term.

The rotationally grazed ewes gained an average of .10 kg/day and .16 kg/day, whereas the "continuous" herd gained .14 kg/day and .18 kg/day. This slightly superior performance by the "continuous" group was a bit surprising. However, the presumably higher protein content of the "rotational" flock would likely not benefit ewes on a maintenance regime.

Although the rotationally grazed forage was much more aesthetically pleasing and appeared to be of superior quality and uniformity, productivity was not any higher than the forage on the non-rotated area. This was despite an additional 30 hours of labour involved in rotating the sheep (44 moves) over the 116 day season. Gains were actually higher on the continuous side. This might be partially due to the notoriously slow regrowth potential of Smooth Brome.

One advantage of rotational grazing may be reduced stress on the plants, resulting in greater longevity. However, there appeared to be similar aftermath on both areas after the sheep were removed.

A tour of the area was held on August 25th. A few producers felt it would be worth the extra labour and were going to try it on their farms. Others felt it was not worth the extra effort.

We will continue this project next spring after plowing and discing, then seeding to a more suitable pasture mix. In addition, young ewes will be used in the trial next year, since they are still growing.

CHEMICAL CONTROL OF BRUSH REGROWTH ON FENCELINES

Brush regrowth is a serious problem on over
500 miles of fenceline.

Project Number:	148
Supervision:	J.R. Green, Pasture Agrologist and J.L. Dobb, Provincial Specialist, Cereal, Oilseeds and Seed Crops, Dawson Creek
Co-operators:	Bear Mountain Community Pasture Association, Groundbirch Livestock Association, Sunset Prairie Livestock Association
Branches:	Regional Extension Services, Peace River Region
Funding:	D.A.T.E. 1984-85 - $1,500 D.A.T.E. 1985-86 - $ 200
Objectives:	To develop an effective method for chemical control of brush regrowth on fencelines by evaluating: a) application methods, b) time of application, and c) herbicide types/ rates, at 3 community pasture locations.

Summary:

There are over 500 miles of fenceline in North and Central B.C., located in wet, native areas on which brush regrowth is a serious problem. Willow, Poplar and Alder regrowth in and around fences creates many problems including increased fence maintenance, increased damage to wildlife, poor livestock distribution and increased round-up costs.

Most wet, native areas are only accessible by foot, horse or all-terrain vehicles. Results of this project would provide the basis for an all-terrain or horse-drawn applicator.

In addition to access, herbicide applied to shrubs and trees must not damage the grass. There may also be some difficulty getting through the brush regrowth in order to apply the herbicide to the leaf areas. Wire and posts not only eliminate the possibility of mechanical control, but also create difficulty when using chemicals.

Vertical spray, rope and carpet-wick as well as granular application methods were to be utilized.

During June, 300 metres of brushed-in fenceline were flagged into 6 metre lengths at Bear Mountain, Sunset and Groundbirch Pasture. This will allow 3 replicates of all desired herbicide - method - time combinations. Spray equipment not on hand was purchased. Then different herbicides were purchased including three new materials still in the research stage:

Dupont	DPX-T6376	Spike WP
Hoechst	Hoe 39866	Spike Gr
Stauffer	Sc-0224	2-4-D + Banvel
Round-up		Tordon 22K
Banvel		Tordon 10K

Although application was made during mid-May to the Ministry of Environment for a Public Use Permit, approval was not received until mid-August, at which time the permit expired. Even though an extension could have been obtained, it was considered preferable to wait until early in 1985 so that a valid comparison of 2 or 3 application dates during June to August could be made. Consequently, this very important project will be continued early next summer.

BEEF EXTENSION PROGRAM EVALUATIONS

Project Number: 149

Supervision: Dr. R.J. Richmond, Beef Cattle Specialist, Kamloops

Co-operators: W. Freding, Director, B.C. Cattlemen's Association, Kamloops

Branches: Livestock

Funding: D.A.T.E. 1983-84 - $2,300

Objectives: To study the Idaho State Total Beef Program and evaluate development and extension techniques applicable to the B.C. Beefup program.

Summary: The Beefup program is designed to help producers evaluate the profitability of their management systems and identify ways by which they might increase net profits. Beefup provides an opportunity for producers to have a more direct influence on extension and research by identifying those factors most important to their net profit and which should be given priority attention.

Making sure that all efforts in extension and research are coordinated and directed towards goals that will help producers achieve greater net profits is a major task. Evaluating similar programs in other commodities or other parts of the country can often help in avoiding mistakes in the initial stages of program development.

The Idaho Total Beef Program and the U.S.D.A. program on Integrated Reproduction Management are in many ways similar in both concept and approach to the Beefup program and have just gone through many of of the coordination problems now facing the Beefup program.

Each of these programs was evaluated during a program review meeting in Moscow, Idaho attended by state and federal extension and research specialists responsible for program development, implementation and funding. Both producer and extension viewpoints were recorded. Factors in program structure, composition and delivery which might be useful to the Beefup program were identified.

As a result of this evaluation a major Management Seminar was presented in Kamloops at which United States and British Columbia extension and research people together with B.C. producers exchanged ideas for beef extension in the Province.

CONTROLLING RESIDENT ELK ON PRIVATE AGRICULTURAL LAND

Shooting platforms were erected adjacent to irrigated pastures.

Project Number: 150

Supervision: J. A. Pelter, Director, Livestock Branch, Victoria

Co-operators: B.C. Agricultural Research and Development Corporation (ARDCORP); Dr. James Hatter, Wildlife Consultant, Victoria; L. Belway and R. Belway (Belway Ranches), East Kootenays; H. Forstbauer, Rancher, East Kootenays; G. Creelman, President, East Kootenay Livestock Association

Branches: Livestock

Funding: D.A.T.E. 1984-85 - $5,430

Objectives: To evaluate and demonstrate in a pilot project the feasibility of controlling resident elk (non-migratory) on private ranch lands through the use of shooting stands to remove elk from irrigated crop land.

Summary: The problem of elk causing damage to private holdings in the East Kootenay region has existed for years. It appears to have been accentuated by a behavioural change towards year-round lowland residency by a portion of the elk population. Resident elk have caused damage to fields, fences and to haystacks.

Between July 24 and August 2, 1984, three shooting platforms were erected adjacent to irrigated pastures on the Belway ranch and the Forstbauer ranch. Each platform was fifteen feet from the ground level to the platform floor. A plywood enclosure three feet high, five feet wide and seven feet long with viewing openings on three sides was placed on top of the platform. Standard scaffolding steel frames and half inch plywood sheathing were used in the construction. The platforms can be dismantled and moved to new locations or stored with a minimum of effort.

Guidelines were developed to be given to hunters given permission to shoot from the platforms by co-operating ranchers.

Two bull elk were taken from the Belway's stands during the first few days of the season. The hunters reported that the elk were completely unaware of the hunters' presence, as expected.

Preliminary reports confirm the need for a special early elk season by permit and permission of the landowners prior to the general open season with accompanying disturbance and low hunter success. The project is ongoing and a final report and recommendations will be submitted following closure of the hunting season.

CONTROLLING CLUBROOT OF COLE CROPS WITH LIME

Clubroot of cole crops is a threat to Fraser Valley vegetable crops.

Project Number:	151
Supervision:	Mark Sweeney, District Horticulturist, Abbotsford
Branches:	Regional Extension Services, South Coastal Region
Funding:	D.A.T.E. 1984-85 - $1,000
Objectives:	To determine if the use of calcium nitrate and other basic fertilizers, in addition to high rates of lime, can reduce clubroot infection to below economic levels.

Summary:

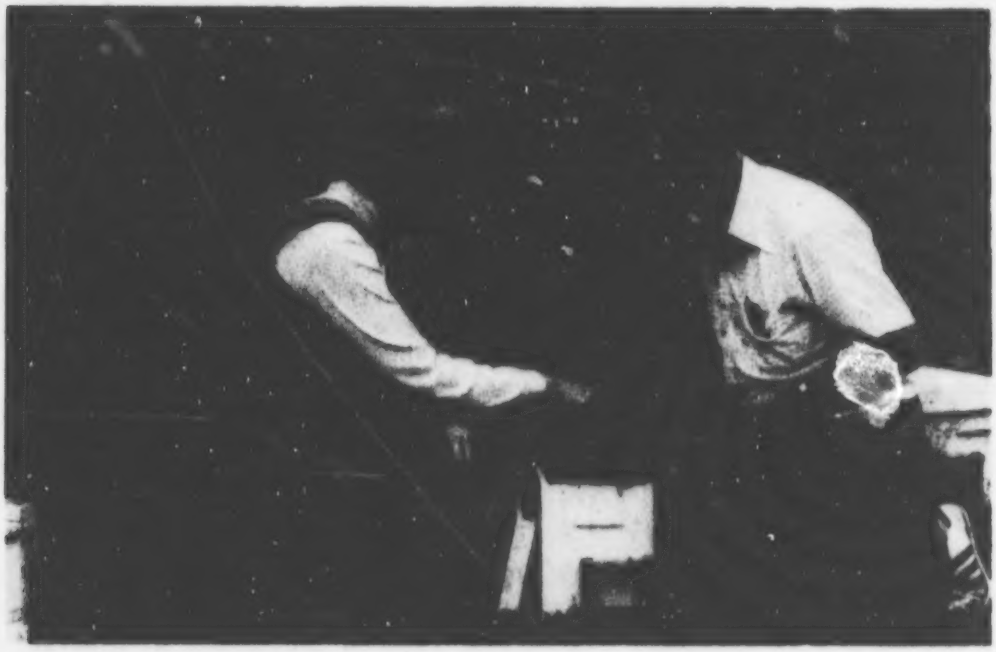
The fungus disease, clubroot, is responsible for significant yearly losses to the $10 million Fraser Valley cole crop industry. No feasible controls yet exist, but local work has shown that heavy lime applications to maintain the soil pH above 7.0 can reduce clubroot infection to below economic levels. Several growers have been successful in achieving clubroot suppression with lime, but many more have failed because soil pH could not be maintained at a high enough level.

Standard nitrogen fertilizers are acid and may be one factor contributing to lower soil pH and increased clubroot infection. An alternate nitrogen source, calcium nitrate, is basic and work in other areas suggests that its use can reduce clubroot infection.

In this study, a high rate of lime (10 tons per acre) was applied to a plot heavily infested with clubroot. A crop of cauliflower was then grown with an N source of either ammonium nitrate or calcium nitrate. Clubroot infection and yield data are being collected.

The lime application has given significant clubroot suppression. Early indications are that the calcium nitrate treatment has further reduced the amount of clubroot infection compared to ammonium nitrate, but not enough to affect yield.

MAINTAINING AND TESTING B.C. HONEYBEE STOCK



An apiculture specialist and a project technician examining a queen mating nucleus hive at Powell River

Project Number:	152
Supervision:	D. M. McCutcheon, Supervisor of Apiculture, Abbotsford
Co-operators:	B.C. Honey Producers' Association; Dr. M. Winston, Biological Sciences, Simon Fraser University; Meadow Mills Bee Farm, Armstrong; Sunshine Sheep and Honey Farm, Powell River
Branches:	Field and Special Crops - Apiculture Program
Funding:	D.A.T.E. 1984-85 - $16,050
Objectives:	To maintain honeybee breeding stock developed by the B.C. Honeybee Stock Improvement Project.

To test comparatively, production and overwintering performances of representatives of the stock developed by the project.

Summary: The honeybee breeding stock developed by the B.C. Honeybee Stock Improvement Project has been maintained over the 1984 active season. The methods used ensure the survival of at least equal, if not better, breeder stock for 1985. The fall preparation of the holding hives has been completed, thus ensuring overwintering success and the availability of selected stock for 1985.

Queens developed at Powell River and Vernon by the Stock Improvement Project are being tested against a commonly used bee stock from California. Thirty queens, each from Powell River, Vernon and California were installed in a co-operator's hive at Armstrong in May, 1984.

The worker bee offspring from a newly installed queen does not completely populate a hive for 8 weeks, thus it is not possible to compare production during the initial year.

Production will be measured by obtaining weekly weight gain measurements during an active honeyflow in 1985. This measurement correlates with seasonal production capabilities. Overwintering success will be measured by comparing fall and spring hive weights to determine the level of consumption of stores. Overwintering success will also be judged by standard population and brood estimates in the spring of 1985.

PROPAGATION AND CONTAINER GROWING OF NURSERY STOCK

Propagation house showing irrigation
system installation.

Project Number:	153
Supervision:	N. Senn, Provincial Nursery Crops Specialist and P. Leidenfrost, Technician, Cloverdale
Branches:	Field and Special Crops
Funding:	D.A.T.E. 1984-85 - $5,800 D.A.T.E. 1985-86 - $1,500
Objectives:	To provide a facility to carry out ongoing propagation studies and container growing demonstration projects on nursery stock.

Summary:

Construction of the 20 X 48 ft propagation house, a prefabricated, predrilled gothic-arch style metal frame greenhouse covered with a double layer of polyethelene film, located at the Agriculture and Food Centre in Abbotsford, was completed in October, 1984. Water and sewer lines for irrigation and mist systems and electricity are in place.

Initial propagation trials using the greenhouse facility commenced in late 1984. The first series of studies will investigate direct incorporation of fertilizers into rooting media. The objective will be to develop specific fertilizer recommendations for direct sticking of unrooted cuttings. The development of such recommendations will reduce the time needed to produce a saleable plant, and reduce handling and production costs.

DEMONSTRATION OF INTEGRATED PEST MANAGEMENT FOR VANCOUVER ISLAND VEGETABLE CROPS

Project Number:	154
Supervision:	Andrea Buonassisi, Pest Control Specialist, Cloverdale; Paul Heels, summer student
Co-operators:	Bong Eng, Raymond Galey, Terry Lim, Jim and Jack Mar, Vern and Wilmer Michell, vegetable growers, Victoria; Dr. R. Vernon, Agriculture Canada Research Station, Vancouver
Branches:	Crop Protection
Funding:	D.A.T.E., 1984-85 - $9,950
Objectives:	To use integrated pest management to time and reduce the number of insecticidal sprays required for the control of carrot rust fly (*Psila rosae*) and onion maggot (*Delia antiqua*) without increasing crop damage. The underlying objective was to demonstrate that pesticides, when used properly, can delay the development of pesticide resistance and reduce the potential adverse effects on the environment.

Summary:

The monitoring systems used in this study were based on those designed for commercial carrot and onion growers on the Lower Mainland of the Fraser Valley, which have been operating successfully for several years. Using this approach to insect monitoring, growers have been able to accurately time sprays and significantly reduce the number of sprays applied. The majority of carrot (28.3 hectares) and onion (12.1 hectares) fields on the Saanich Peninsula of southern Vancouver Island were monitored this year for carrot rust fly and onion maggot respectively. Based on insect trap counts, growers were advised whether or not a pesticide should be applied. Growers were responsible for choice of chemicals and application rates and were free to accept, reject or supplement any spray recommendations.

Carrot rust fly populations were low in most of the 20 carrot fields monitored and consequently few or no sprays were recommended. Spray reductions, compared to growers' previous routines, ranged from 10-100 percent in 18 fields. Two fields required a slight increase over the number of sprays the grower would normally have applied. An average of 56

percent fewer sprays were used for carrot rust fly control in monitored fields. Had growers followed all recommendations, 75 percent fewer sprays would have been applied and 60 percent of the fields would have had no sprays. Additional unrecommended sprays were applied in the early stages of monitoring before growers gained enough confidence in the system. Adequate insect control was confirmed by sampling the crop for damage and by questioning growers about damage found during harvest.

Onion maggot flies were not caught on traps in any of the monitored fields and no sprays were recommended. One spray was recommended for 6 of the 8 onion fields planted before monitoring had commenced and fly populations determined. An additional 12 unrecommended sprays were applied by groweres. Growers applied 50 percent fewer sprays for onion maggot control this season (growers normally apply 3-6 sprays). A 100 percent reduction in sprays could have been achieved had monitoring begun earlier and had growers followed all recommendations.

VENTILATION SYSTEMS FOR LIVESTOCK

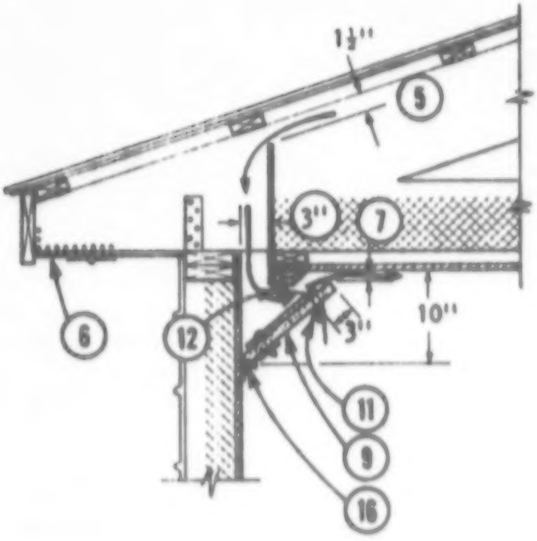


Diagram of side air inlet for confinement livestock and poultry facility

Project Number: 155

Supervision: Phil Johnson, Agricultural Engineer, Abbotsford

Co-operators: Greg Harms, Vancouver

Branches: Engineering

Funding: D.A.T.E. 1984-85 - $16,600

Objectives: The objective of this project is to research and produce four technical publications about ventilation systems for intensively housed livestock and poultry:

1. Livestock and Poultry Ventilation System Design Handbook (100 sheets).

2. Ventilation of Milking Centres - Holding Area, Milking Parlour and Milk Room.
3. Natural Ventilation Systems for Swine Operations.
4. Micro-processor Control for Livestock and Poultry Ventilation Systems.

Summary: The demand for information and on-farm consultations in the area of ventilation system design and trouble-shooting is steadily growing. Good written information and training seminars on the application of such information is necesary to meet this demand if private sector industries are to effectively provide consultative services in this critical area. It is recognized that improving the environment in intensive housing for livestock and poultry can significantly increase production by reducing death loss, incidence of sickness and necessity for administering antibiotics and reducing elements in the environment that limit growth rate.

The end results of this project are to be four up-to-date, practical publications on the design and management of good ventilation systems.

Promotion of the use of the publications will take place by seminars for agri-business field staff.

AGRICULTURAL LAND CLEARING IMPROVEMENT PROGRAMS

Central Interior land-clearing methods and techniques were discussed stressing soil management and topsoil conservation

Project Number:	156
Supervision:	Garth Elgie, District Agriculturist, Prince George
Co-operators:	Eric Schulz and John Metzger, Engineering Branch, BCMAF; B.C. Ministry of Lands, Parks and Housing, local staff; local land clearing contractors; local land owners whose lands were used to demonstrate equipment use and land clearing techniques; Jim Collins, Consulting Agrologist
Branches:	Regional Extension Services, Central Region; Engineering Branch

Funding: D.A.T.E. 1984-85 - $5,000

Objectives:

1. To provide an opportunity for inexperienced contractors and farmers to become familiar with agricultural land clearing requirements, techniques and equipment.
2. To stress the importance of soil management and topsoil conservation when developing land for agricultural use.
3. To familiarize other local Ministries, i.e. the Ministry of Lands, Parks and Housing, with agricultural requirements and concerns when developing land.
4. To update costs associated with land development in the Central Interior.

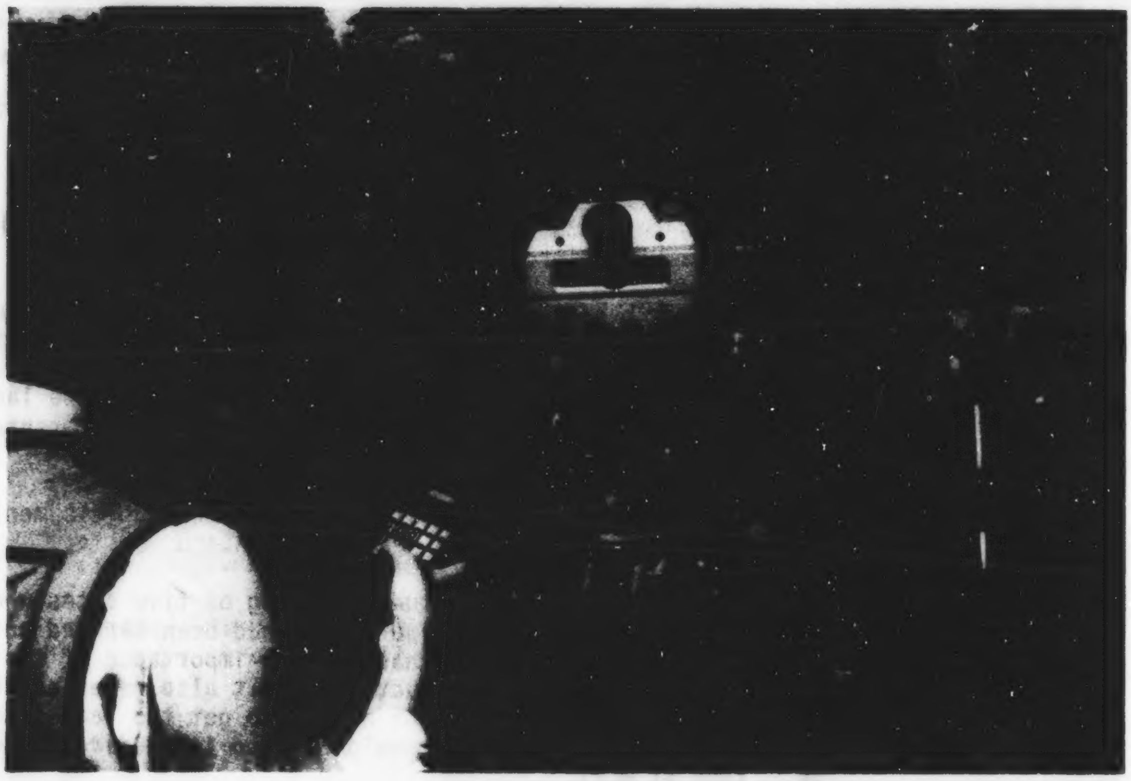
Summary:

A one-day workshop and field tour was held August 2 in the Prince George area. The morning workshop provided a detailed summary of three main land clearing methods: stumping; knockdown with cutting and piling; and breaking of the land with the removal of roots and rocks. Papers were presented dealing with problems encountered when incorrect land-clearing methods are used. Soil preservation was related to techniques and equipment use. Land development costs were reviewed and the various operations costed.

An afternoon field tour included viewing of five sites where good or poor land-clearing operations had been carried out. The poorly cleared sites emphasized the importance of topsoil preservation and future productivity. It also revealed the added cost of land development needed to get the land into a productive state. Standard equipment and innovative methods were seen at work.

Participants included farmers, prospective farmers, future land owners, government employees involved with land development and local land-clearing contractors.

COMPUTER-AIDED DRAFTING OF DRAINAGE PLANS



Field evaluation of electronic topographic survey equipment.

Project Number: 157

Supervision: John Metzger, Agricultural Engineer, Abbotsford

Co-operators: Dr. S.T. Chieng, Bio-Resources Engineering Department, U.B.C.

Branches: Engineering

Funding: D.A.T.E. 1984-85 - $2,900

Objectives: To evaluate state-of-the-art computerized survey and drafting techniques used in preparing subsurface drainage system plans.

Summary: One of the most time consuming and tedious aspects of drainage system installation is the topographic survey and subsequent data reduction, system design and drafting work. This project seeks to evaluate some of the computerized equipment and techniques now available for this purpose.

An Omni-1 electronic survey instrument was rented for one month to evaluate the following apparent advantages in doing topographic surveys for drainage design:

1. Time saving
2. Accuracy
3. Compatibility with computers for subsequent data transfer, manipulation and ultimately computer-assisted plotting and design

Computer-assisted drafting was initiated through use of the facilities and programs at the Department of Bio-Resources Engineering at the University of British Columboa.

Evaluation of the electronic survey equipment and the computer-assisted design and drafting facilities indicates that the technology for both aspects is becoming well established. However, some limitations currently exist and are summarized as follows:

1. The Omni-1 has inherent operational idiosyncracies which take time to master for efficient use and operation. These are summarized in a detailed report available from the Ministry's Engineering Branch office in Abbotsford.

2. To be fully successful, data transfer capabilities to a local computer (preferably of a personal computer type) should be available. Our evaluation required that survey data be transferred to the U.B.C. computer for subsequent manipulation and plotting.

3. The computer-assisted design and drafting software developed by Dr. Chieng requires further development and simplification before it is suitable for production scale use in the design office of a drainage contractor or engineer.

DEMONSTRATION OF DRAINAGE SYSTEM COMPONENTS

A properly constructed drain pipe outlet structure and ditch.

Project Number:	158
Supervision:	John Metzger, Agricultural Engineer, Abbotsford
Co-operators:	M.G. Driehuyzen, Soils Branch, BCMAF
Branches:	Engineering
Funding:	D.A.T.E. 1985-85 - $1,000

Objectives: To establish a site which demonstrates a variety of recommended subsurface drain outlet structures on a well-constructed, protected and maintained open drainage ditch at the Boundary Bay Water Management Project.

Summary: The drainage ditches at the Boundary Bay Water Management site in Delta were excavated, deepened and widened with 1 to 1 side slopes to stabilize the banks. Nine outlet structures made from corrugated steel and concrete asbestos pipe were installed over the existing drain outlets. Several types of outlet grates were installed to keep rodents out of the drain lines. Grass sod was installed adjacent to the drain lines and the remaining bank was seeded to a grass-seed mix, especially developed for ditch bank stabilization.

A well constructed and protected subsurface drain outlet is essential to maintain functioning of a subsurface drain. Plastic drainage tubing especially requires a protected outlet, since grass fires, rodents, prolonged sunlight and the occasional ditch maintenance equipment operator can easily destroy exposed and poorly protected pipe.

The installation of well constructed outlet pipes has been recognized as an indispensible part of a drainage system and is standard practice in Ontario, Quebec and Alberta. In B.C., drainage contractors have been reluctant to use similar structures because of the additional cost, which is minimal. As a result, the loss of function of complete drainage lines within a few years of installation has occurred. This installation provides an opportunity for contractors, designers and farmers to view well constructed drain pipe outlets.

WASTE MANAGEMENT GUIDELINES FOR FARMS IN ENVIRONMENTALLY SENSITIVE AREAS

Project Number:	159
Supervision:	Brian Scott, A.E.S. Technician, Abbotsford
Branches:	Engineering
Funding:	D.A.T.E. 1984-85 - $5,500
Objectives:	The objective of this project is to minimize watercourse contamination on a selected watershed area in the Lower Fraser Valley by identifying sources of contamination, recommending changes in facilities and management and implementing those changes.

Summary:

Complaints regarding contamination of Lower Fraser Valley watercourses are being received not only from local producers and residents, but also from Provincial Ministry of Environment Conservation Officers and Federal Fisheries and Oceans Inspectors. Mounting pressure on the agriculture community to clean up selected watercourses is the initiative behind this project.

Following methods used in similar work in Vernon and Quesnel, a small watercourse has been identified and will be surveyed. Sources of contamination will be identified and interviews with producers involved will be conducted. Technical information and plans will be provided regarding methods of clean-up such as site plans, diagrams showing required drainage and structural plans for manure storage. In co-operation with funding agencies, such as the ALDA program, financial aid may be made available.

Agricultural waste management problems are manifest during the winter and early spring so it was planned not to start work until January, 1985 with completion of the survey and design phases by April.

CENTRE PIVOT SYSTEMS IN BRITISH COLUMBIA

Project Number: 160

Supervision: T.W. Van der Gulik, Agricultural Engineer, Abbotsford

Co-operators: Greg Harms, Project Contractor; Ted Moore, Assistant District Agriculturist, BCMAF; Lance Brown, Engineering Technologist, BCMAF; Ashcroft Ranch, Nicola Ranch; South Slope Feeders, Ashcroft; Bow Glen Estates, Walhachin; Agriculture Canada, Kamloops

Branches: Engineering

Funding: D.A.T.E. 1984-85 - $5,500

Objectives: To determine if centre pivot systems are applying a sufficient amount of irrigation water to sustain a crop at maximum production through the growing season. Irrigation, precipitation and evapotranspiration were measured at each site throughout the irrigation season. Soil moisture was also monitored.

The project also evaluated the usefulness of using a washtub for evaporation measurement and irrigation scheduling to determine when the crop requires water.

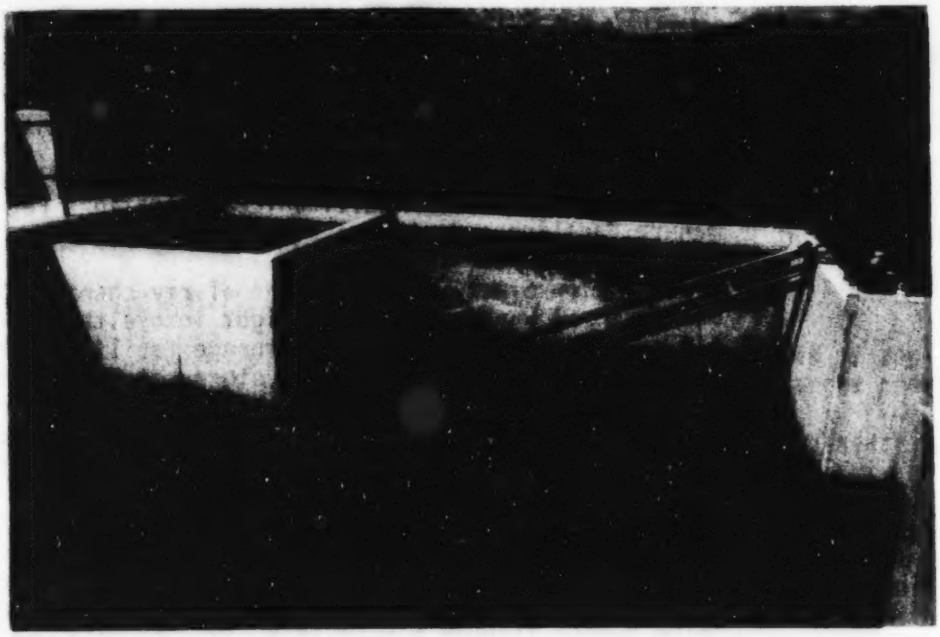
Summary: Although all the data has not yet been analyzed, the following comments can be made at this time:

- A washtub can be used to measure evaporation and this can be related to crop water use.
- The washtub can be used as an effective irrigation scheduling tool providing the farmer is conscientious and also monitors soil moisture. An Engineering Note will be prepared to assist the rancher.
- The evenness of water application of all the pivots tested was acceptable. This includes low pressure and high pressure pivots.

- Although alfalfa has a rooting depth of 4 feet, the soil regime was very dry below 1 foot in depth. The full storage capacity of the soil is therefore not being used. During very hot, dry weather the crop may suffer some adverse effects as a result.

The results of this project will be presented to producers in the form of an Engineering Note and other publications. Further work is required to determine if current irrigation practices are indeed resulting in crop reduction. Crop yield data, comparing two separate fields, one irrigated by a wheelmove system and the other by a centre pivot is required. The project will be refined and hopefully carried one more season.

WASTE MANAGEMENT PROGRAM



Circulatory manure agitation system at a modern dairy farm.

Project Number:	161
Supervision:	Rick Van Kleeck, Agricultural Engineer, Abbotsford
Branches:	Engineering
Funding:	D.A.T.E. 1984-85 - $10,200
Objectives:	The objectives of the project are to research and produce four technical publications on dairy waste handling:

1. Recommended Manure Handling Systems for Fraser Valley Dairy Farms
2. Gravity Flow Slurry Channels
3. Circulatory Agitation System
4. Slotted Floor Dairy Housing

The information obtained will enable Ministry staff to do a more effective job in assisting dairy producers to improve waste handling systems on farms.

Summary:

There are several options for collecting, storage and land spreading of dairy manure. A good comprehensive description of three of the recommended options is required to assist dairy producers to make sound decisions. With printed information, together with plans, less time will be required by Ministry staff for individual consultations regarding manure handling and storage.

Gravity Flow Slurry Channel: The slurry channel allows manure to flow under its own weight into either a reception pit or directly into a manure storage facility. There are estimated to be 50 gravity flow slurry channels in the Fraser Valley at the present time and there is great interest in this system. There are limitations with this method of moving manure. Data is required to enable proper design and operation of the system.

Circulatory Agitation System: The manure is stored in a divided structure that allows manure to be moved around the structure (in a racetrack manner). It is moved and mixed by being pumped through a hole in a dividing wall. A standard propeller manure agitator is used as the pump. Approximately 20 such systems are being used locally. Data is required to enable proper design and operation of the circulatory agitation system.

Slotted Floor Dairy Housing: This is an old system that has not been used until recently due to problems. One of the problems was removing the manure from storage below the slats; this has been overcome by the development of the circulatory agitation system of storing and mixing the manure. A major concern is gas production from the manure. There are at least 7 barns of this type in the Fraser Valley. Effort is required to ensure that this system is environmentally safe for the cattle and operator.

The project will require interviewing dairy producers to determine operating limitations and recommended management of the systems under this study. The budget allows for additional gas sampling work to gain further data relative to the safety of slotted floor buildings.

POULTRY DISEASE MANUAL

Project Number: 162

Supervision: Dr. Peter Hewitt, Acting Director, Veterinary Branch, Victoria

Co-operators: Dr. R.J. Avery, Former Director, Veterinary Branch

Branches: Veterinary

Funding: D.A.T.E. 1984-85 - $3,500

Objectives: To complete a comprehensive manual on diseases of poultry for use by both small poultry flock owners and larger operators.

To help them to better understand and handle disease problems in their flocks.

Summary: A third draft of a manuscript of 116 typewritten pages has been completed. A preface has been written and a glossary of 57 terms has been prepared for inclusion in the manual. Forty-seven black and white and coloured photographs illustrating the various diseases described in the text have been obtained and catalogued for inclusion in the completed manual.

The fourth and anticipated final draft is now being prepared and the goal is to have the manuscript ready for submission to Agriculture Canada for approval and co-operation in publishing in the spring of 1985.

CARROT VARIETY AND CULTURAL DEMONSTRATION

Harvesting the carrot variety demonstration.

Project Number	163
Supervision:	R.D. Hallman, District Horticulturist, Creston
Co-operators:	Lou Truscott, Vegetable Producer; Members of Creston Valley Vegetable Growers' Association
Branches:	Regional Extension Services, Okanagan-Kootenay Region
Funding:	D.A.T.E. 1984-85 - $500
Objective:	To demonstrate that a commercial crop of carrots of acceptable quality can be grown on the Creston Flats. To assess the suitability of several potential cultivars for commercial production with special emphasis on quality problems that have been experienced in the local area. To study the storability of cultivars that are included in this demonstration.

Summary: Many agricultural producers in the Creston area have been looking for alternative crops to the traditional grains and forages. Carrots have been identified as a good potential crop for these and other producers in this area because of the following:

1. Carrots have good overall potential as indicated in the "Fresh Market Opportunities Study" completed in December, 1983 for the Creston Valley Vegetable Growers' Association. This study covered southeastern British Columbia and Alberta.
2. Much of the land in the Creston area is now in grain and forage crops. These producers are not interested in switching into vegetable crops such as cauliflower which would involve a lot of hand labour. Mechanically harvested crops such as carrots are of interest to them.
3. Because of the local climate, vegetable crops that have been identified as having the most potential are cole crops and root crops.

This demonstration was planted adjacent to a small commercial field of the Six Pak variety of carrots. 18 varieties were planted, including most of the main commercial varieties, some new varieties and Scarlet Nantes for comparison. The main qualities looked for were total marketable yield and freedom from surface roughness. Rough surfaced carrots have been one of the primary stumbling blocks to expanded carrot production in this area. Roughness is thought to be related to variety, soil type and weather variations.

The project included a field day for interested growers after which the plots were harvested and several observations recorded. Flavour Pak and Exp 2101 produced the highest marketable yields of the varieties grown. Varieties with the smoothest surface were Scarlet Nantes, Paramount and Exp 2101, while the roughest were Sundance, Pak More, Spartan Sweet and Top Pak.

CRESTON VALLEY VEGETABLE GROWERS' HARVEST AND POST-HARVEST TECHNOLOGICAL INFORMATION PROJECT

Onion harvesting equipment in Washington State.

Project Number:	164
Supervision:	R.D. Hallman, District Horticulturist, Creston
Co-operators:	Members of the Creston Valley Vegetable Growers' Association; Jim Conroy, Vegetable Specialist, BCMAF; Mark Sweeney, Vegetable Specialist, BCMAF; Dr. Peter Perrin, Research Scientist, Agriculture Canada, Agassiz Research Station; Washington State Extension Service Personnel; Washington State Vegetable Producers, and the following growers - Lou Truscott, Doug Sutcliffe, Dave Pridham, and Bill Truscott
Branches:	Regional Extension Services, Okanagan-Kootenay Region
Funding:	D.A.T.E. 1983-84 - $2,000

Objectives:

1. To travel to areas of existing large commercial production of vegetables which show potential in the Creston Valley to study both harvest, post-harvest and storage methods used in those areas.
2. To bring back information learned and to use it in this area to avoid problems that others have experienced during the expansion of commercial vegetable operations.

Summary:

A study of fresh produce market potential for Creston Valley was completed in 1983 and it identified a number of vegetables with potential for commercial production. In order to compete with existing producers, Creston Valley growers must ensure that the quality of the produce is as good or better than that from other areas. To examine harvest and post-harvest methods used in commercial production, two trips were made by two members of the Creston Valley Vegetable Growers' Association and the project supervisor. The first trip involved touring facilities in the Fraser Valley where several types of post-harvest cooling systems and storage facilities were observed, as well as the overall process of harvesting, cooling, packing and shipping. The second trip, to Washington State, involved examining harvesting, packaging and storage of vegetables such as onions, carrots, corn, tomatoes and other summer vegetable crops.

Both trips were documented in note and picture form. Two slide shows are now available from the project supervisor.

MICROCOMPUTERS FOR RANCH MANAGEMENT AND ANALYSIS

Project Number: 165

Supervision: G. Roger Keay, Regional Farm Economist, and Charles E. Brown, Farm Business Management Technician, Kamloops

Branches: Economics

Funding: D.A.T.E. 1984-85 - $12,000
D.A.T.E. 1985-86 - $ 4,000

Objectives: To demonstrate the use of microcomputers in recording and analysing ranch physical and financial information to improve beef industry management practices.

Summary: With the advent of the microcomputer, farmers and ranchers are entering the computer age. Microcomputers have the capability of storing, sorting, re-organizing and recalling information to provide reports useful to the management of the modern ranch or farm operation.

Two microcomputers and the Microsoft Multiplan spreadsheet program were purchased in June, 1984. The Macintosh computer was chosen as the microcomputer easiest to learn and operate. The computers will be used during the first winter to demonstrate the ways the Multiplan program can be used. This program will initially be used for developing cash flow projections, breakeven feeder prices and forage production cost and return statements. Workshops have been scheduled for Kamloops, Cranbrook and Vernon and are being planned for several other areas in the province.

Future plans include the purchase of a Data Base Management program which will be used to demonstrate the maintenance and analysis of herd records. Investigation of the suitability of maintaining financial records on Multiplan or the Data Base Management program will be pursued before an accounting program will be purchased. Manual procedures for analysing financial records have been computerized using the Multiplan program.

SPECIAL CROPS EVALUATION PROJECT

Project Number: 166

Supervision: Satwant Dhindsa, Regional Field Crop Specialist, Fort St. John

Co-operators: L.E. Bomford, District Agriculturist, BCMAF; Karl Wuthrich, Farmer, Fort St. John; Wayne Parker, Rancher, Dawson Creek; Victor Jeanotte, Farmer, Fort St. John

Branches: Regional Extension Services, Peace River Region

Funding: D.A.T.E. 1984-85 - $750

Objectives: To evaluate the adaptability and yield potential of some alternate crops for the B.C. Peace River area.

Summary: Three separate trials were established and monitored under this project, including Alternate Legume, Winter Cereal and Faba Bean Silage.

a) Alternate Legume Trial

Eight legume varieties were seeded at the farm of Karl Wuthrich on May 28 and May 29, 1984. Each variety was seeded in either 12 or 9 inch rows in 16 X 44 foot plots. These included 3 Lentils as well as a single Alfalfa, Red Clover, Faba Beans, Flat Pea and Field Pea variety. These were monitored throughout the summer for adaptability, yield and relative N fixation. Yields were taken September 27. There was some insect damage toward the end of the summer.

b) Winter Cereal

The Norstar Wheat and O.A.C. Wintri Triticale were seeded September 22, 1983 at the Vic Jeanotte farm. Four replicates were utilized, each consisting of 4, 22 cm wide rows that were 6 m long. Neither variety survived the winter.

c) Faba Bean Silage Plot

An acre of Diane Faba Beans was seeded at the Wayne Parker Farm near Dawson Creek again during mid-May. Yields taken August 21 averaged 6.3 tonnes per hectare. Although the crop was cut, prolonged wet weather prevented ensiling the crop.

BIOLOGICAL CONTROL OF GRASSHOPPERS

Project Number: 167

Supervision: P. Fofonoff, District Agriculturist, Duncan; W. Weber, Bird Control Specialist, Cloverdale

Co-operators: Springhouse Grasshopper Control Committee, Chimney Creek; Dr. D. Johnson, Entomologist, Agriculture Canada; P.J. Procter, Entomologist, BCMAF; Springhouse 4-H Club; Williams Lake Field Naturalists (Technical Support)

Branches: Crop Protection; Regional Extension Services, South Coastal Region

Funding: D.A.T.E. 1984-85 - $1,500

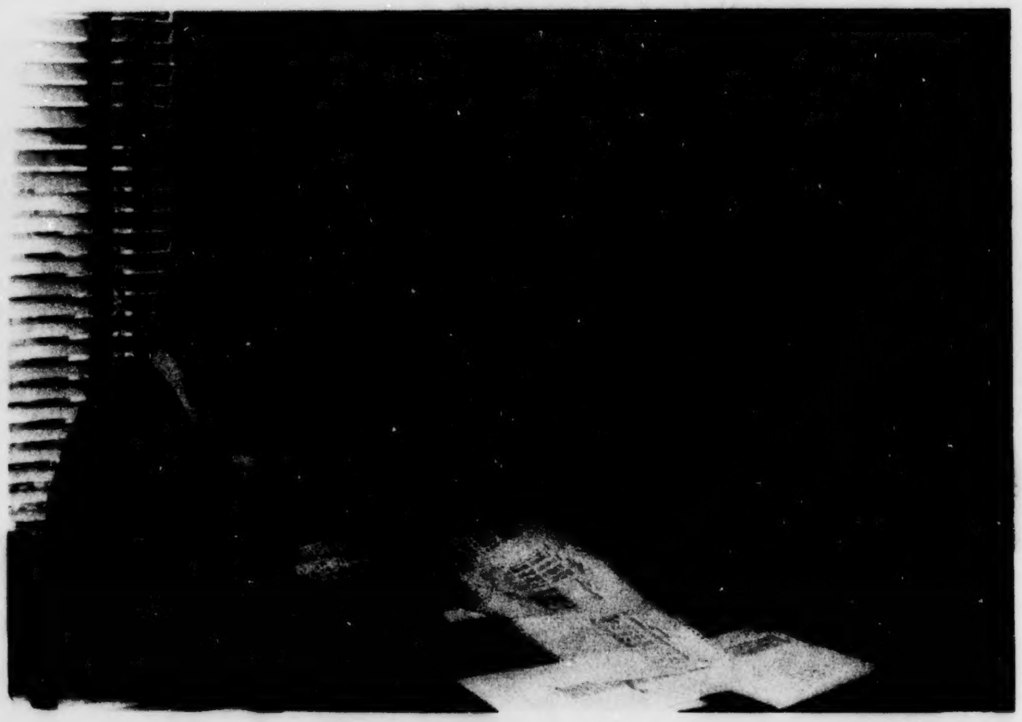
Objectives: To evaluate the effect of increasing the local Mountain Bluebird population for an effective biological control method of grasshoppers.

Summary: Mountain Bluebird nesting boxes were placed in known grasshopper areas in April. Monitoring of nest boxes by BCMAF summer students took place in May and June.

Species	Percentage of Nesting Boxes Monitored	
	May 29th	June 28th
Mountain Bluebird	18.6	19.8
Other Species	50.0	54.5
Unused	31.4	25.7

As a result of damp, cool weather during May and June, no significant grasshopper infestations were observed. Further monitoring for grasshopper and Bluebird populations is proposed for 1985.

ECONOMICS OF ORCHARD PRODUCTION SYSTEMS



A cost model was developed on a microcomputer.

Project Number:	168
Supervision:	George Geldart, Regional Farm Economist, Summerland
Co-operators:	Howard Joynt, Farm Business Management Technician, BCMAF; Mike Sanders, Provincial Tree Fruit Specialist, BCMAF; Tim Watson, Tree Fruit Commodity Coordinator, BCMAF; Leo Touw, Commercial Grower, Kelowna; Ken and Margaret Hayter, Commercial Growers, Kaleden; Ken Ziebart, Commercial Grower, Oliver; Buck Barkwill, Commercial Grower, Summerland
Branches:	Economics

Funding: D.A.T.E. 1984-85 - $30,000
D.A.T.E. 1985-86 - $ 1,000

Objectives: To develop a production cost model on a microcomputer to evaluate the profitability and financial implications of various intensive planting systems for apples.

Summary: As economic conditions change, the agricultural industry must adapt in order to maintain sound, viable farms. Over the past few years there has been an increasing interest in growing apples in high density systems. Such intense production yields a greater number of apples earlier in the life of an orchard, than do standard or lower density systems.

As an aid to determine which system is best from a financial and economic point of view, a model was developed in the fall of 1984 to analyse the costs and returns for various densities. The Apple Macintosh micro-computer was selected because of its portability and relatively low cost, so that analyses could be conducted at workshops as well as on individual farms. When combined with other criteria, the computer model will enable an orchardist to make a decision on the most profitable planting density for replanting an existing orchard or establishing a new one. The model is flexible in that it can be adjusted to reflect a grower's individual situation. For example, changes in the quantity, quality, and prices of apples can be made in order to determine the effects on profit.

This cost model is directly coordinated with the Ministry's Regional Extension Program, and will enhance the production recommendations of horticulturists, by placing more emphasis on the financial and economic aspects of intensive apple production.

During the next year, extension material will be prepared to summarize the results of the model for various apple planting systems. As well, workshops are planned to demonstrate the computer technology and its application to farm management.

PEACE RIVER CEREAL AND OILSEED EVALUATION PROJECT

Project Number:	169
Supervision:	Brian Baehr, Regional Director, Peace River Region, Dawson Creek
Co-operators:	Dr. Bob Wolfe, Plant Breeder, Agriculture Canada, Beaverlodge Research Station; J.L. Dobb, Provincial Specialist, Cereal, Oilseed and Seed Crops, BCMAF; Satwant Dhindsa, Regional Field Crop Specialist, BCMAF; Bill Bickford, Farmer, Montney; Alberta Wheat Pool, Dawson Creek
Branches:	Regional Extension Services, Peace River Region
Funding:	D.A.T.E. 1984-85 - $5,000 D.A.T.E. 1985-86 - $5,000
Objectives:	To evaluate and demonstrate the adaptability of new cereal and oilseed varieties in the B.C. Peace River Region.

Summary:

Two half-hectare sites were selected for the Regional Cereal and Oilseed Evaluation Project. The South Peace trial was located at the Alberta Wheat Pool (A.W.P.) elevator, 2 km east of Dawson Creek. The North Peace site was situated at the Bill Bickford farm, 12 km north of Fort St. John.

After being cultivated and harrowed, both locations were seeded by Beaverlodge Research Station people on May 30 and 31.

Sixty-three different varieties were seeded including 30 Barley, 11 Hard Red Spring Wheat, 11 Oat, 4 Flax and 7 Canola. A replicated (3), completely random block design was utilized. Each replicate consisted of four, 5 metre rows, 20.5 cm apart.

Most of the cereals and oilseeds are standard, licensed varieties. Many have been recently developed. Several others are in the final stages of licensing.

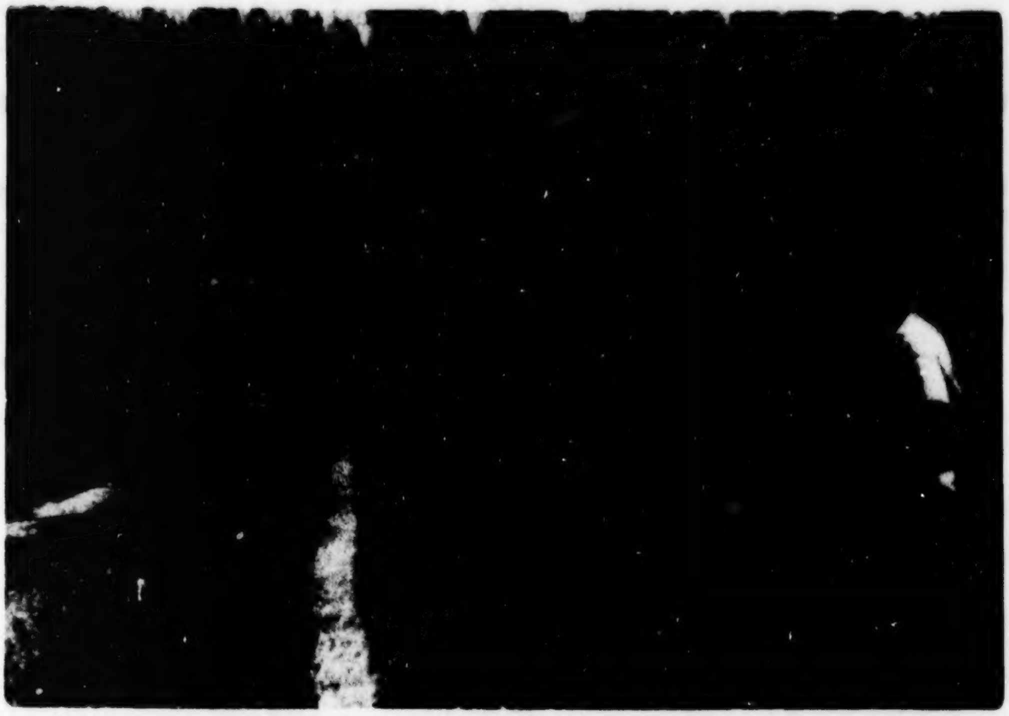
Extremely heavy rainfall following seeding of the Bickford site caused severe crusting of the soil as well as "drowning" of the seed, resulting in very poor germination and emergence. Consequently the North Peace plot was not maintained or harvested.

Although not as severe, heavy rains and flooding created problems at the A.W.P. site. The Oat and Flax trials were "lost" due to prolonged flooding. The Wheat, Barley and Canola, however, did fairly well and were harvested during mid-September.

Relative yield data will form the basis for the 1985 Peace River Field Crop Variety Recommendations.

One large tour (Seed Growers) and several mini tours examined the A.W.P. site this past summer.

SMALL IRRIGATION DAM MAINTENANCE INITIATIVE PROGRAM



One of three dam sites in the Kamloops area
selected for upgrading.

Project Number:	170
Supervision:	T.W. Van der Gulik, Agricultural Engineer, Abbotsford
Co-operators:	Greg Harms, Project Contractor; Stan Duggan, Dam Inspector, B.C. Ministry of Environment; Heffley Lake Irrigation District; L. Guichon, Peter Hope Lake dam site; Lance Brown, Engineering Technician, BCMAF
Branches:	Engineering
Funding:	D.A.T.E. 1984-85 - $7,000

Objectives: To demonstrate maintenance procedures and development of improved design standards for small irrigation dams. The status of small irrigation dams in the interior of B.C. has deteriorated to the point that some dams may be condemned and the water storage license revoked. This situation has come about mainly due to a lack of maintenance.

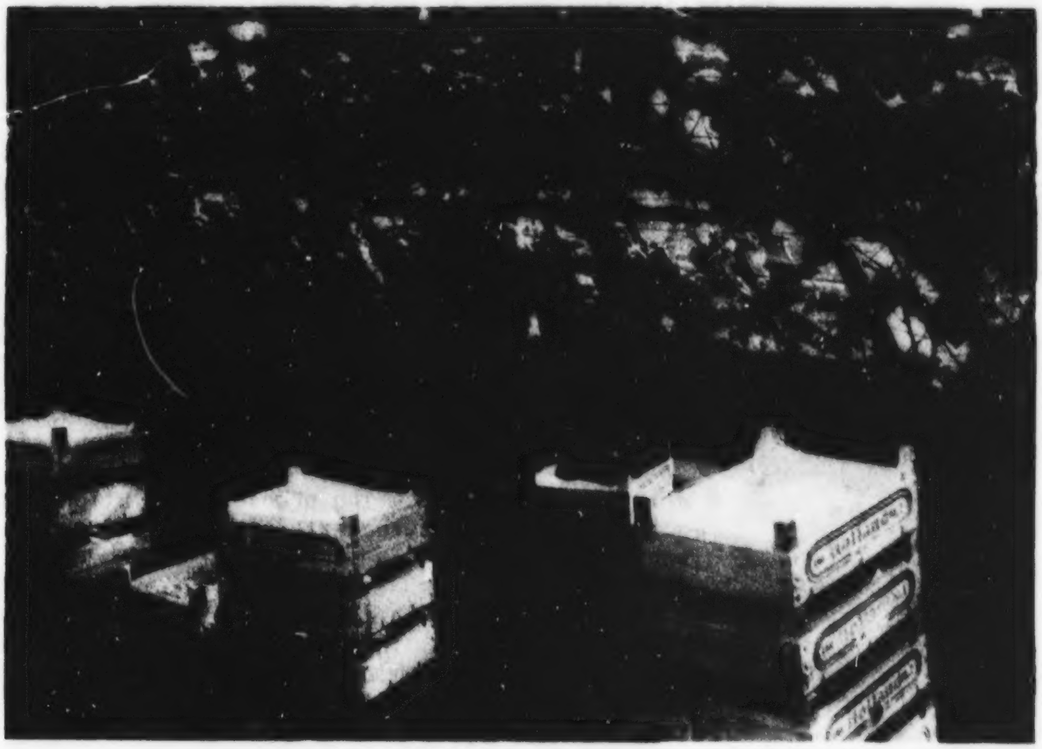
Summary: Three dam sites that required upgrading were selected in the Kamloops area. The dams were upgraded to the standard established by the Water Management Branch, Ministry of Environment. Equipment used, materials required and time duration were all recorded.

The data collected will be used in the following manner:

- A slide-tape presentation will be made showing the importance of a regular dam maintenance program. Educating the rancher that there is indeed a problem is the first step towards alleviating the current situation.
- A written report indicating problems, solutions and costs required to carry out the extensive upgrading will be distributed.
- The work carried out in 1984 provides the ground work towards establishing a program that can assist ranchers in tackling the problem of upgrading dams in poor condition. Various programs will be investigated in the future.

The poor condition of existing dams affects not only potential irrigation water supply but also fisheries, wildlife and recreational usages.

TECHNOLOGY STUDY TOUR OF HUNGARY, GERMANY AND ENGLAND TO IMPROVE GRAPE PRODUCTION IN BRITISH COLUMBIA



Grapes growing in a greenhouse in Holland.

Project Number:	171
Supervision:	J. Vielvoye, Provincial Grape Specialist, Kelowna
Branches:	Regional Extension Services, Okanagan-Kootenay Region
Funding:	D.A.T.E. 1984-85 - $7,800
Objectives:	Identify and import new and better grape varieties, equipment and production techniques to reduce costs in the domestic grape and wine industry.

Summary: Consumer interests have switched dramatically from red to white wine. British Columbia must replace many existing grape plantings with suitable Vitis vinifera varieties as well as consider grape production for wine and fresh markets in the Fraser Valley and on Vancouver Island.

Centers of viticulture expertise in Hungary and Germany which are climatically similar to the Okanagan Valley, as well as England, where rapid progress has been made on the development of the wine industry in a climate very similar to the Fraser Valley were visited. Additional information concerning the greenhouse production of table grapes was obtained in the Netherlands. Numerous varieties worthy of evaluation, and cultural techniques were identified. Procedures to import these new varieties have been initiated.

Agreements were reached as a result of personal contact with many leading scientists in the countries visited, to exchange scientific data, compare several scientific analytical procedures and exchange, for evaluation purposes, new varieties of potential value to British Columbia.

VINEYARD SURVEY FOR BOTRYTIS RESISTANCE TO ROVRAL

Technician extracting Botrytis fungus spores.

Project Number:	172
Supervision:	J. Vielvoye, Provincial Grape Specialist, Kelowna; J.M. Yorston, Plant Pathologist, Summerland
Co-operators:	Nancy Wardle, Project Employee; Dr. Bill McPhee, Plant Pathologist, Penticton; B.C. Grape Growers' Association; Agriculture Canada, Summerland Research Station
Branches:	Regional Extension Services, Okanagan-Kootenay Region; Crop Protection Branch
Funding:	D.A.T.E. 1984-85 - $6,300
Objectives:	To determine the level of resistance (if any) of the bunch rot fungus, Botrytis, to the fungicides Rovral and Captan.
Summary:	This project was started in September and will not be completed until December, 1984. As the work is currently under way only a progress report is given.

Twenty-three vineyards, including several known to have a history of Botrytis were sampled. All areas of the Okanagan-Similkameen from the United States border to Vernon were sampled. Rotting fruit samples were collected wherever possible, but because of the dry summer, a few vineyards had no fruit bunch rot. In these cases, litter was collected from the vineyard floor. Known problem varieties, i.e. Riesling, Foch, Verdelet and DeChaunac were sampled. Botrytis was found in each vineyard and is being stored for laboratory analysis in the near future.

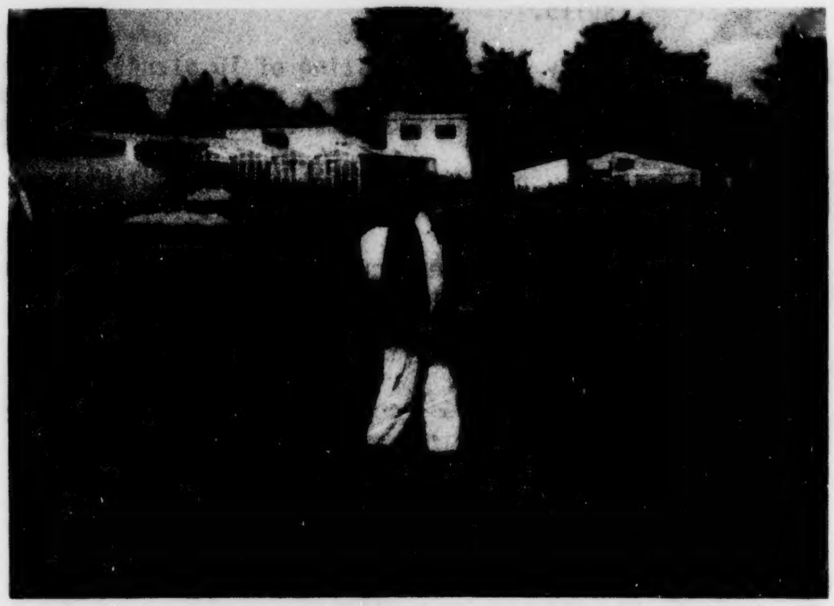
Each fungus isolation will be tested for resistance to the fungicides Rovral and Captan. Ten samples from each vineyard will be tested at four concentration levels of each chemical. As of October 24, 1984 all of the test plates were prepared and the testing was to take place.

Results from this test will show if the bunch rot fungus, Botrytis, is developing resistance to Rovral or Captan. This information will be used for making future spray recommendations so that Rovral, the most useful chemical for bunch rot control, can be used for many years to come.

CROPPING TOMATOES AND CUCUMBERS UNDER THERMAL CURTAINS

Project Number:	173
Supervision:	Brian E. Mauza, Greenhouse Specialist, Agriculture and Food Centre, Abbotsford
Co-operators:	B.C. Hydro
Branches:	Field and Special Crops
Funding:	D.A.T.E. 1984-85 - $1,700 D.A.T.E. 1985-86 - $ 250
Objectives:	To determine the effect of a horizontal thermal screen on the earliness, fruit set, vegetative growth and disease problems of tomato and cucumber crops in a greenhouse. Energy use will also be monitored.
Summary:	Horizontal thermal curtains have been identified as energy saving devices. If hothouse vegetable growers are to use them, a positive improvement in crop growth is necessary. The thermal curtain under test was installed in November of 1984, delaying the start of our project by three months. A tomato crop will be monitored for growth effects and energy use and compared to a crop growth without the curtain.

EVALUATION AND DEMONSTRATION OF VARIOUS ASPECTS OF HIGHBUSH BLUEBERRY PRODUCTION IN THE SOUTH COASTAL REGION



Preplant soil treatment for blueberries.

Project Number:	175
Supervision:	J.T. Hill, District Horticulturist, Agriculture and Food Centre, Abbotsford
Co-operators:	Crop Protection Branch, BCMAF; Soils Branch, BCMAF; J.S. Gaskin, Propagator
Branches:	Regional Extension Services, South Coastal Region
Funding:	D.A.T.E. 1984-85 - $4,500 D.A.T.E. 1985-86 - $2,700
Objectives:	1. To evaluate new varieties of blueberries for the South Coastal area. 2. To evaluate the effect of planting in nematode free soils.

3. To develop sulfur application rate for lowering pH on mineral soils. To determine the effect of various sources of nitrogen fertilizers when used on high pH soils.

Summary: A variety trial consisting of 10 plants of 11 varieties was established in 1984. More varieties will be added to this planting in 1985 and future years.

Soil was prepared and fumigated for planting of the nematode trial in 1985.

Soil samples were incubated in pH lowering trial. Field testing in this trial will be done in 1985.

INVESTIGATION OF CO-OPERATIVE LAMB MARKETING PROGRAMS IN THE MARITIME PROVINCES

Project Number: 176

Supervision: Dr. Steve Mason, Provincial Sheep Specialist, Abbotsford

Co-operators: Hildred Finch, Secretary-Manager, B.C. Sheepbreeders' Co-operative; Debbie Larson, Market Co-ordinator, B.C. Alpine Lamb

Branches: Livestock

Funding: D.A.T.E. 1984-85 - $2,784

Objectives: To examine current co-operative lamb marketing programs in Nova Scotia, New Brunswick and Prince Edward Island. Information gathered is to be applied to the development of a similar program to market B.C. Alpine Lamb.

Summary: In 1982, the B.C. Ministry of Agriculture and Food commissioned, with ARDSA funding, the B.C. Sheep and Lamb Marketing Opportunities Study. The Study, completed in 1983, suggested that significant potential existed to increase domestic marketing of lamb to meat markets, independents and small chains within the province. As a result, in 1984, the B.C. Sheepbreeders' Co-operative as agents of the B.C. Sheep and Wool Commission initiated a program to market B.C. Alpine Lamb in the interior cities of Kamloops, Revelstoke, Vernon, Kelowna and Penticton. The project was to be very similar in design and scope to projects currently underway in the Maritime Provinces. Consequently, it was felt that studying those projects would help the B.C. program to avoid the pitfalls and capitalize on the successes of their experience.

The two co-operators travelled to the Maritimes and spent two days each in Nova Scotia, Prince Edward Island and New Brunswick with the respective market managers. The areas included personnel and their responsibilities, financial accounting, slaughter, distribution, promotion, market opportunities and returns to producers. The applicability of their methods to the marketing of B.C. Alpine Lamb were examined. Since the two co-operators are the key organizers of the B.C. project, appropriate findings are being directly applied for the benefit of lamb producers in this province.

MEASUREMENT OF SOIL EROSION IN PEACE RIVER REGION

Project Supervisor L. Van Vliet (with shovel) and Collins' farm employee, Ken Giest repair sideboards around erosion plots on Collins farm.

Project Supervisor L. Bomford cleaning out soil from catchment tank after measuring water runoff.

Project Number:	177
Supervision:	L. Bomford, District Agriculturist, Fort St. John; L. Van Vliet, Soil Management Specialist, Agriculture Canada, Vancouver Research Station
Co-operators:	J.A. Collins, Farmer, Fort St. John
Branches:	Regional Extension Services, Peace River Region
Funding:	D.A.T.E. 1984-85 - $1,410

Objectives:	To determine amounts of soil loss under different soil management techniques and with different crops.
Summary:	This plot was constructed in 1982 and has been managed by Ministry of Agriculture and Food staff since that time. It is similar to plots in Dawson Creek and Beaverlodge, Alberta. Soil erosion by water is measured in the plots by capturing all waters running off the 15 metre X 5 metre edged enclosures. The runoff is captured in a 10,000 litre tank on the down slope end of each plot.

Samples of the captured runoff are sent to Agriculture Canada in Vancouver for analysis. In 1984 we were able to measure soil losses equivalent to 26 tonnes per hectare from a single event. Total soil losses for the year will not be known until January, 1985. This is a long term project that will be fully supervised by Agriculture Canada after 1985.

DEMONSTRATION OF ONTARIO MILK RECORDING SYSTEM IN B.C.

Project Number: 178

Supervision: Norm W. Daykin, Supervisor, Dairy Herd Improvement (DHI) Division, Victoria

Co-operators: Dairy Producers - Jim Myhre, Duncan; Walter Dahl, Abbotsford; N.J. Anderson, Salmon Arm; R. Haerdi, Fort St. John
D.H.I.D. Inspectors - Jim Bell, Duncan; Peter Veenbaas, Abbotsford; Ben Harrison, Salmon Arm; E. Pedersen, Fort St. John

Branches: D.H.I. Division; Livestock

Funding: D.A.T.E. 1984-85 - $1,400

Objectives: To determine whether the Ontario Dairy Herd Improvement Corporation can provide laboratory analysis and data processing in a shorter turn-around period, and at a lower cost, than can be provided by the agencies currently serving the British Columbia Dairy Herd Improvement Program.

Summary: In 1984, the B.C. Ministry of Agriculture and Food requested that the industry examine the privatization of the British Columbia Dairy Herd Improvement Program. As a result of G. Aylard and A. Pelter visiting the Ontario D.H.I. Corporation on program costs and turn-around time, the industry requested a Pilot Project to determine if the Ontario D.H.I. Corporation could deliver an improved Milk Recording Program for British Columbia producers.

It would also give producers an opportunity to evaluate Ontario's production report and additional management packages that could be used to improve the B.C. program.

Inspectors are taking duplicate milk samples at each of the farms selected. One set is being sent to Ontario for analyzing and processing, and the other set is being processed through the B.C. system.

The Pilot Project producers are comparing the efficiency of service from both laboratories.

FOOD IRRADIATION SEMINAR

Project Number: 179

Supervision: R.C. Kilpatrick, Agricultural Engineer Abbotsford

Co-operators: Theo Ouwerkirk, Gamma Processing International Ltd.; Ian Campbell, Health Protection Branch, Health and Welfare Canada; Stan Boonstra and Ken Van Gaalen of Fresh Tech Industries Incorporated; BCMAF Marketing Branch staff

Branches: Engineering

Funding: D.A.T.E. 1984-85 - $2,000

Objectives: Familiarize interested members of the B.C. food processing industry with the theoretical, practical, financial, regulatory and marketing considerations of using gamma radiation to extend the shelf life of food products.

Summary: The process of irradiating food to extend its shelf life has been accepted in 22 countries, to date. In Canada, regulations currently limit the use of gamma radiation to potatoes, onions and flour products. The process will undoubtedly have much wider application in this country in the future, as regulations for its use on other foods are developed. A substantial irradiated food export market potential already exists.

On September 12, 1984, the Ministry held a Food Irradiation Seminar at the Richmond Inn, Richmond, B.C. Key speakers at the seminar were Theo Ouwerkerk, Gamma Processing International, and Ian Campbell, Health Protection Branch, Health and Welfare Canada.

Mr. Ouwerkerk's presentation included a current global perspective on food irradiation, non-food processing uses of gamma radiation, the design and operation of food irradiation processing plants and "combination process" food processing.

Mr. Campbell dealt with the regulatory aspects of food irradiation, as well as with some of the difficulties in ensuring that imported food products meet domestic irradiation regulations. He also indicated that a pilot project to develop domestic irradiation regulations for chicken and chicken products was underway, and briefed the participants on the procedures for developing regulations for other foods.

The final speaker, Ken Van Gaalen of Fresh Tech Industries, presented Fresh Tech's plans for an irradiation facility for southern B.C.

The seminar was well attended, with 65 participants representing most sectors of the food processing industry.

TECHNOLOGY TRANSFER - GRAPE PRODUCTION

Project Number: 180

Supervision: J. Vielvoye, Provincial Grape Specialist, Kelowna

Branches: Regional Extension Services, Okanagan-Kcotenay Region

Funding: D.A.T.E. 1984-85 - $1,000

Objectives: Update through seminars and field observations, and assess German viticulture practices, varieties, methods of site selection and vineyard management in British Columbia by a world renowned grape breeder and specialist on site location and vineyard management.

Summary: The grape industry use of German grape varieties and viticulture practices requires periodic updating not generally available from local sources. Dr. Norbert Becker's two seminars dealing with grape breeding and site selection as well as his visits to vineyard sites over a two day period to comment on viticulture practices provided expert assessment of the current grape variety research program undertaken by industry, culture practices used in the industry and general direction of existing research programs. Much useful information was obtained during, and as a result of Dr. Becker's comments.